Sect 98

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Douglas R. Foster, et al.

Serial No.: 09/782,926

Filed: February 13, 2001

Confirmation No.: 1667

Atty. File No.: 41992-00405

For: "INFORMATION ACCESS, COLLABORATION AND INTEGRATION SYSTEM AND METHOD"

Group Art Unit: 2171

Examiner: Not Yet Assigned

SUBMISSION OF FORMAL DRAWINGS

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, DC 20231 ON 9/14/01.

MARSH FISCHMANN & BREYFOGLE LLP

BY: Daxmara Sanchez

Assistant Commissioner for Patents
Washington, D.C. 20231
ATTN: DRAWING REVIEW BRANCH

Dear Sir:

In connection with the above-identified patent application, enclosed for filing with said application are 37 sheets of formal, inked drawings illustrating Figs. 1-37 of the application. Figs. 1-37 constitute all of the drawings in the application.

Respectfully submitted,

MARSH FISCHMANN & BREYFOGLE LLP

By Robert B. Berube

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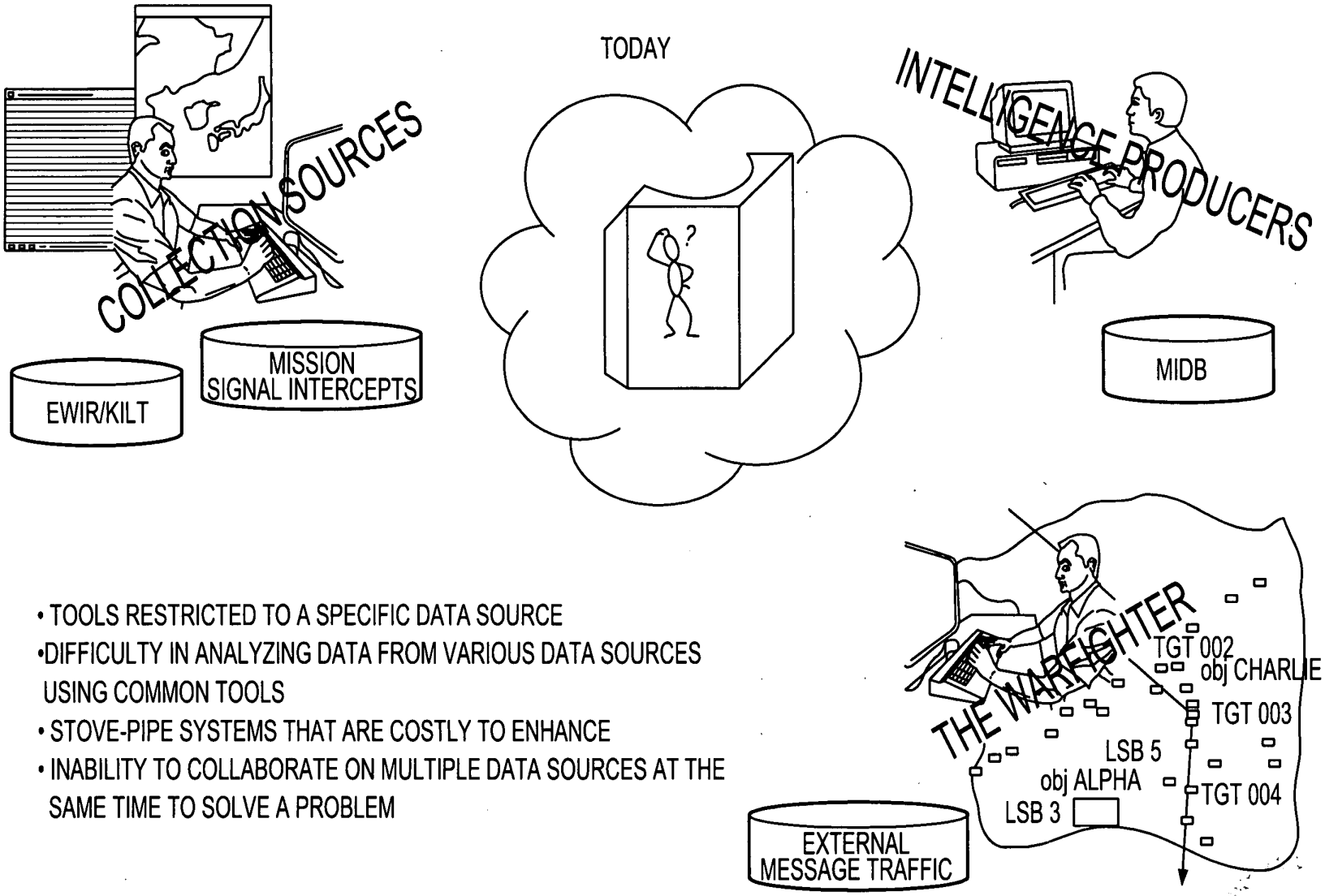
Date: Sept. 14, 2001



- TOOLS RESTRICTED TO A SPECIFIC DATA SOURCE
- DIFFICULTY IN ANALYZING DATA FROM VARIOUS DATA SOURCES USING COMMON TOOLS
- STOVE-PIPE SYSTEMS THAT ARE COSTLY TO ENHANCE
- INABILITY TO COLLABORATE ON MULTIPLE DATA SOURCES AT THE SAME TIME TO SOLVE A PROBLEM

FIG.1

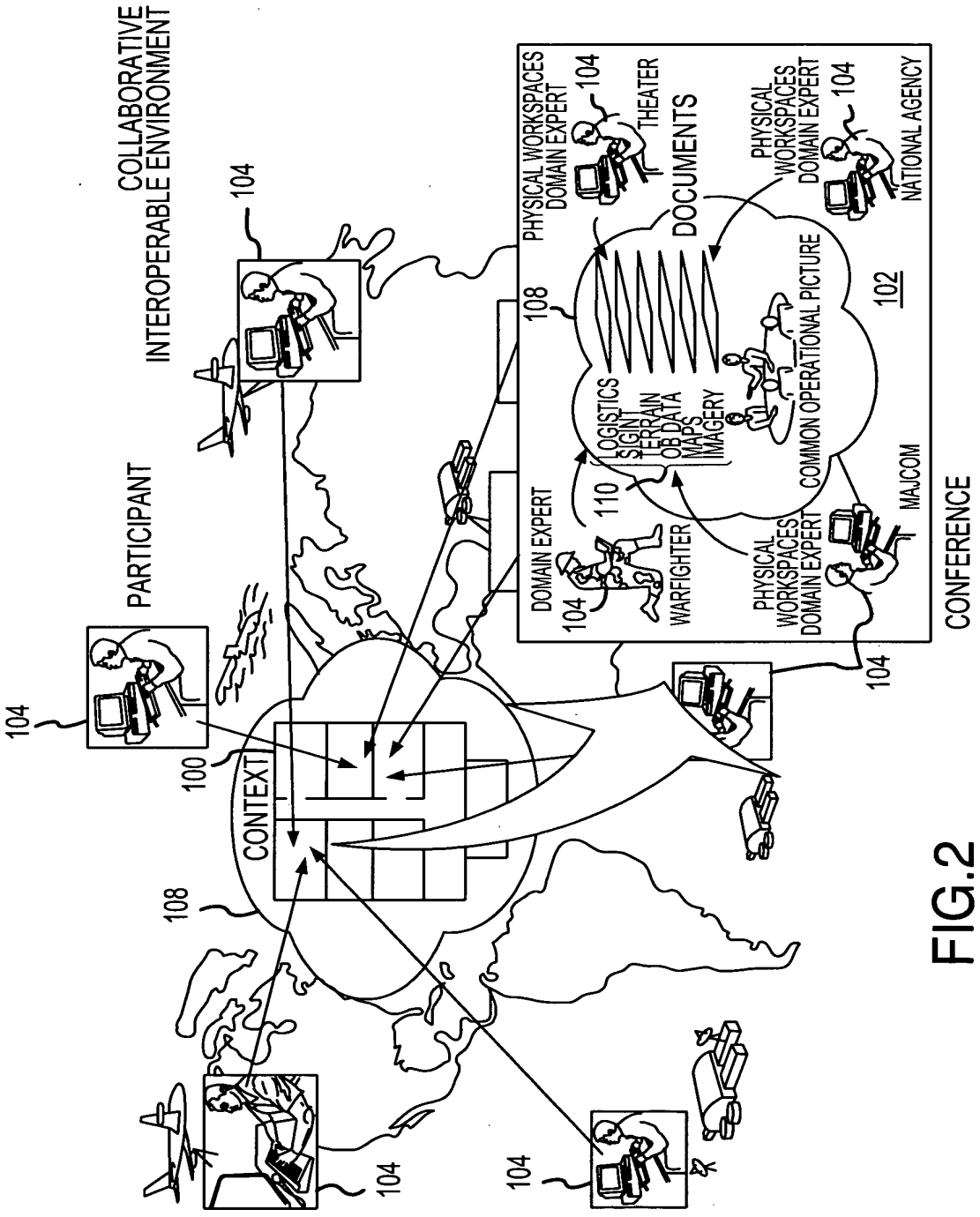

COLLABORATIVE
INTEROPERABLE ENVIRONMENT
PARTICIPANT
CONFERENCE
CONTEXT
COMMON OPERATIONAL PICTURE
DOCUMENTS
LOGISTICS
SIGINT
TERRAIN
OB DATA
MAPS
IMAGERY
PHYSICAL WORKSPACES
DOMAIN EXPERT
THEATER
NATIONAL AGENCY
MAJCOM
WARFIGHTER
100
102
104
108
110

FIG.2

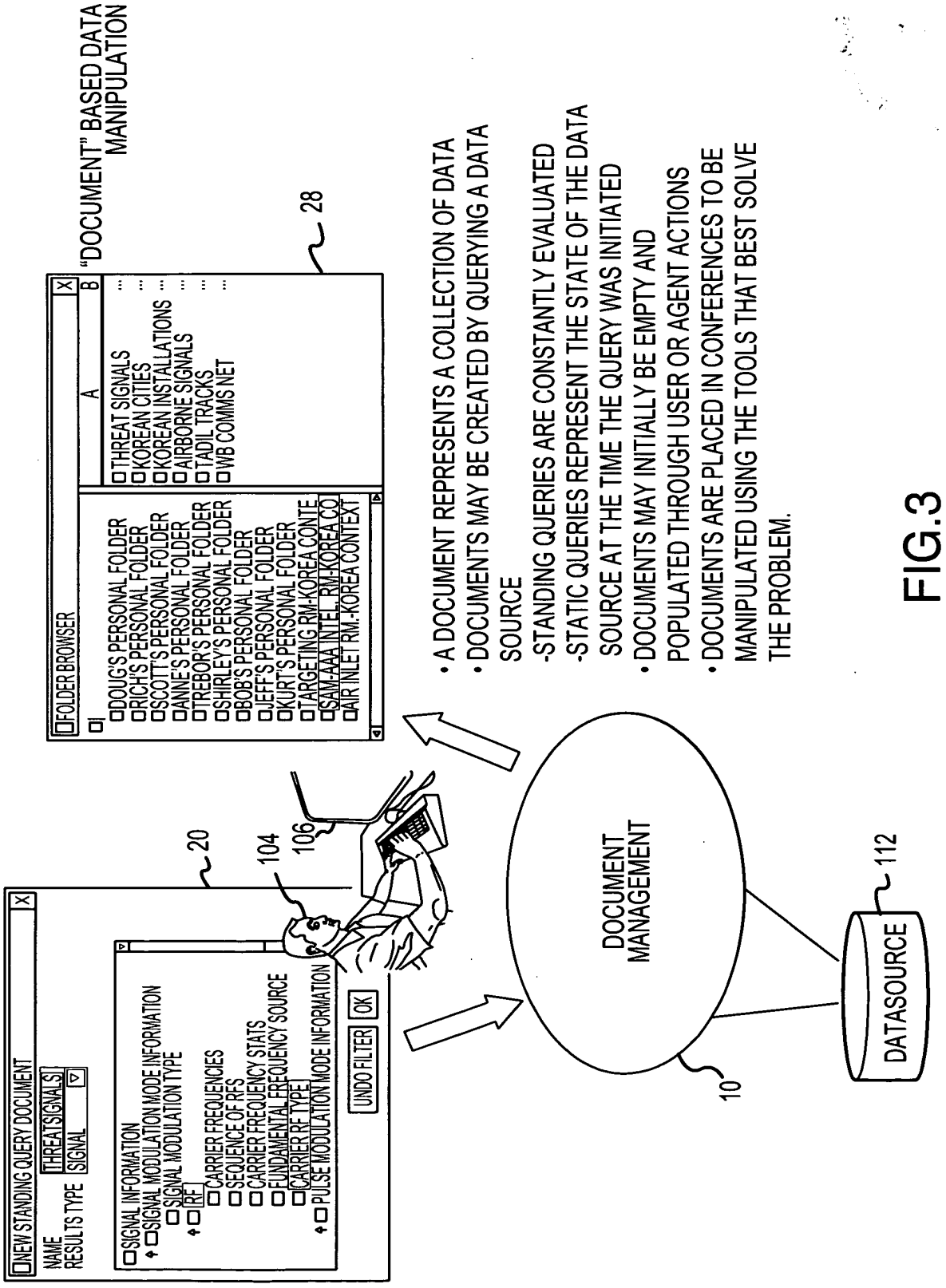

"DOCUMENT" BASED DATA MANIPULATION
FOLDER BROWSER
DOUG'S PERSONAL FOLDER
RICH'S PERSONAL FOLDER
SCOTT'S PERSONAL FOLDER
ANNE'S PERSONAL FOLDER
TREBOR'S PERSONAL FOLDER
SHIRLEY'S PERSONAL FOLDER
BOB'S PERSONAL FOLDER
JEFF'S PERSONAL FOLDER
KURT'S PERSONAL FOLDER
TARGETING RM-KOREA CONTE
SAM-AAA INTEL RM-KOREA CO
AIR INLET RM.-KOREA CONTEXT
THREAT SIGNALS
KOREAN CITIES
KOREAN INSTALLATIONS
AIRBORNE SIGNALS
TADIL TRACKS
WB COMMS NET
28
• A DOCUMENT REPRESENTS A COLLECTION OF DATA
• DOCUMENTS MAY BE CREATED BY QUERYING A DATA SOURCE
-STANDING QUERIES ARE CONSTANTLY EVALUATED
-STATIC QUERIES REPRESENT THE STATE OF THE DATA SOURCE AT THE TIME THE QUERY WAS INITIATED
• DOCUMENTS MAY INITIALLY BE EMPTY AND POPULATED THROUGH USER OR AGENT ACTIONS
• DOCUMENTS ARE PLACED IN CONFERENCES TO BE MANIPULATED USING THE TOOLS THAT BEST SOLVE THE PROBLEM.
NEW STANDING QUERY DOCUMENT
NAME
RESULTS TYPE
THREATSIGNALS
SIGNAL
SIGNAL INFORMATION
SIGNAL MODULATION MODE INFORMATION
SIGNAL MODULATION TYPE
RF
CARRIER FREQUENCIES
SEQUENCE OF RFS
CARRIER FREQUENCY STATS
FUNDAMENTAL FREQUENCY SOURCE
CARRIER RF TYPE
PULSE MODULATION MODE INFORMATION
UNDO FILTER
OK
20
104
106
DOCUMENT MANAGEMENT
10
DATASOURCE
112

FIG.3

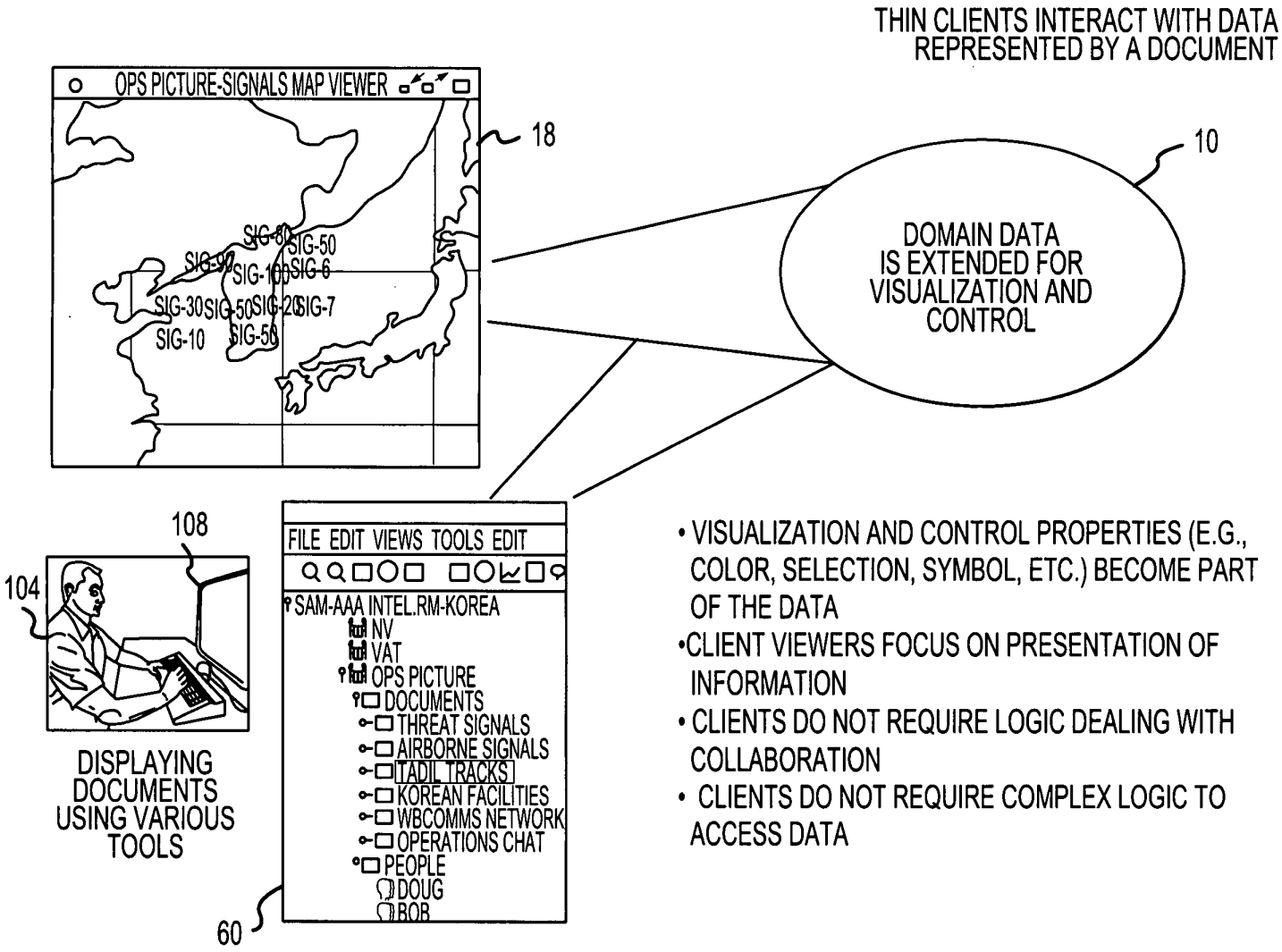
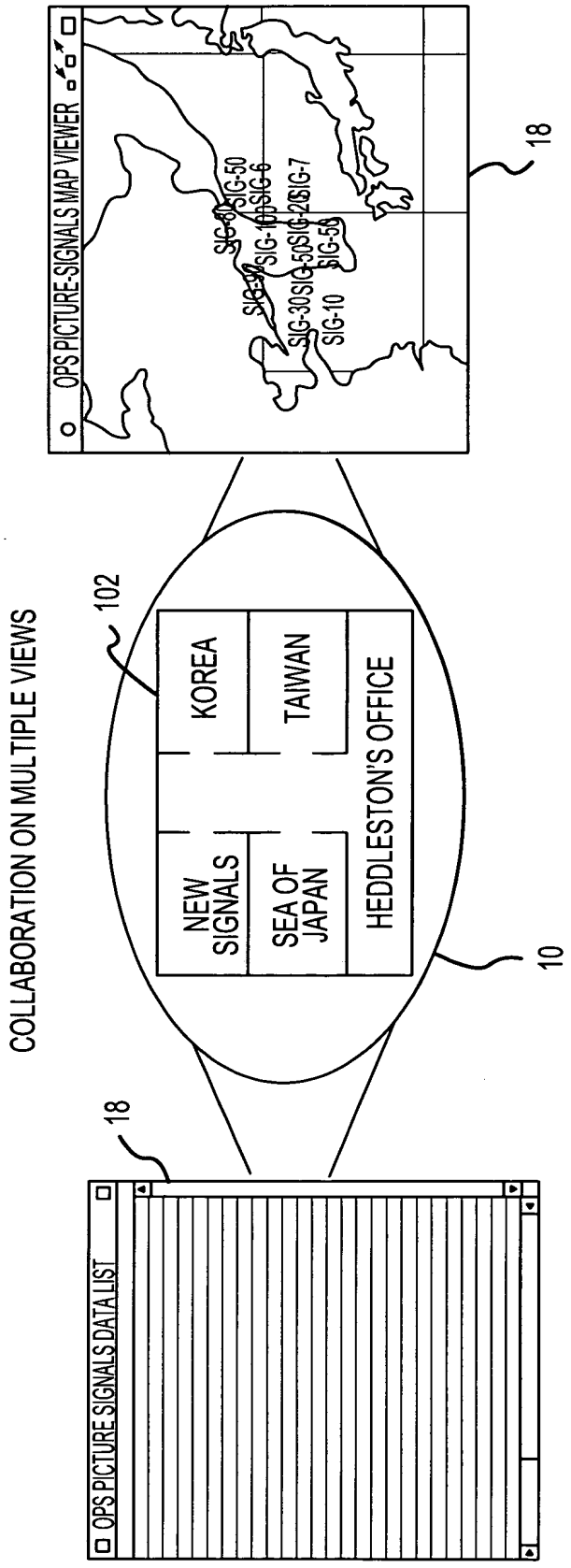


FIG.4

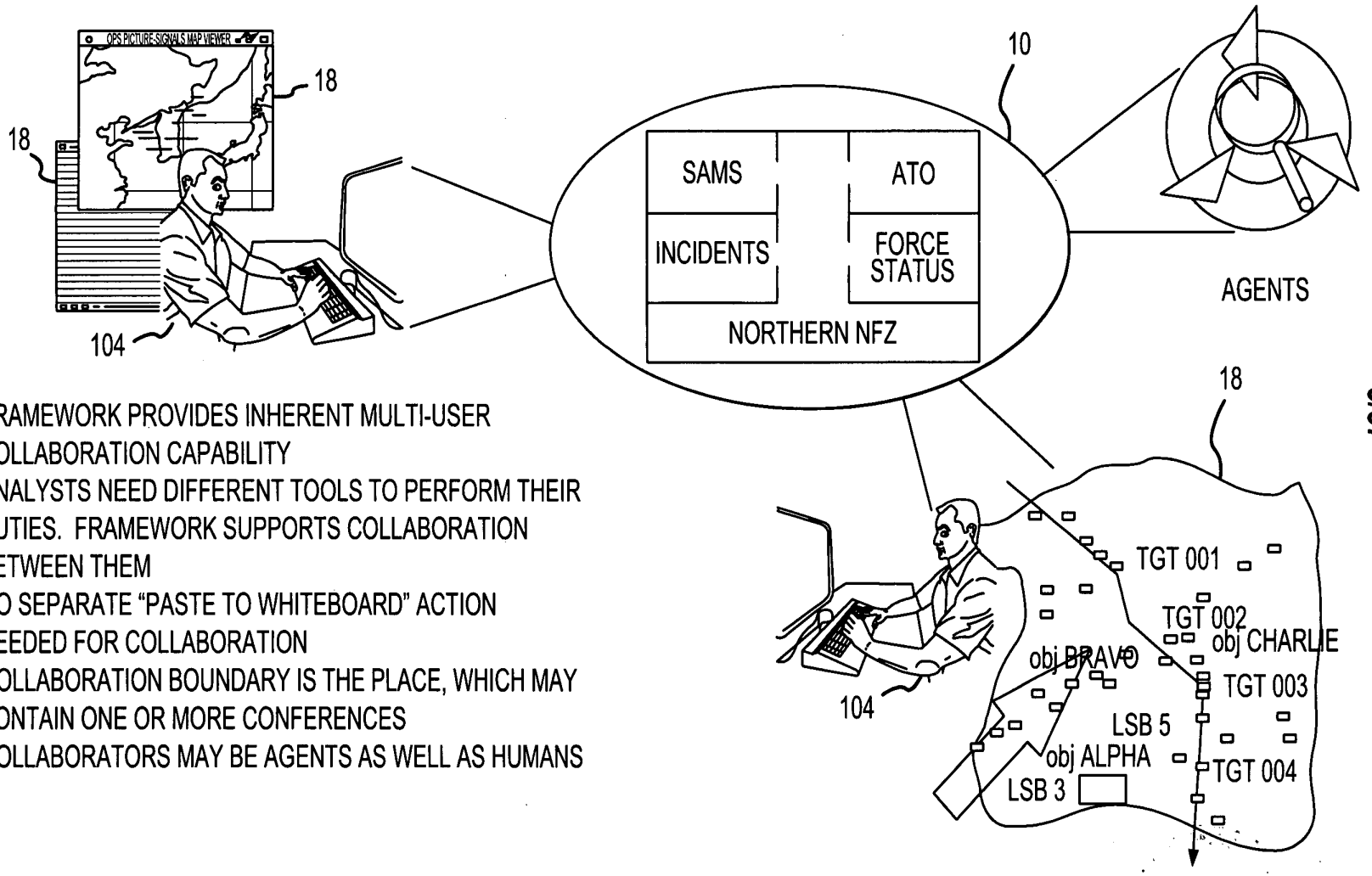
Serial No.: 09/782,926
Title: "Information Access, Collaboration And Integration System And Method"
Applicant: [redacted] Douglas R. Foster, et al.
Docket No.: 41992-00405
Attorney: Robert B. Berube, Tel: (303) 338-0997



- SINGLE USER COLLABORATION
- MULTIPLE TOOLS IN THE SAME CONFERENCE COORDINATE VISUALIZATION (E.G. HIGHLIGHT, COLOR)
- ALL TOOLS IN A CONFERENCE COOPERATE FOR PROBLEM SOLVING
- NO TOOL-TO-TOOL COMMUNICATION

FIG.5

FLEXIBILITY AND COLLABORATION



- FRAMEWORK PROVIDES INHERENT MULTI-USER COLLABORATION CAPABILITY
- ANALYSTS NEED DIFFERENT TOOLS TO PERFORM THEIR DUTIES. FRAMEWORK SUPPORTS COLLABORATION BETWEEN THEM
- NO SEPARATE "PASTE TO WHITEBOARD" ACTION NEEDED FOR COLLABORATION
- COLLABORATION BOUNDARY IS THE PLACE, WHICH MAY CONTAIN ONE OR MORE CONFERENCES
- COLLABORATORS MAY BE AGENTS AS WELL AS HUMANS

FIG.6

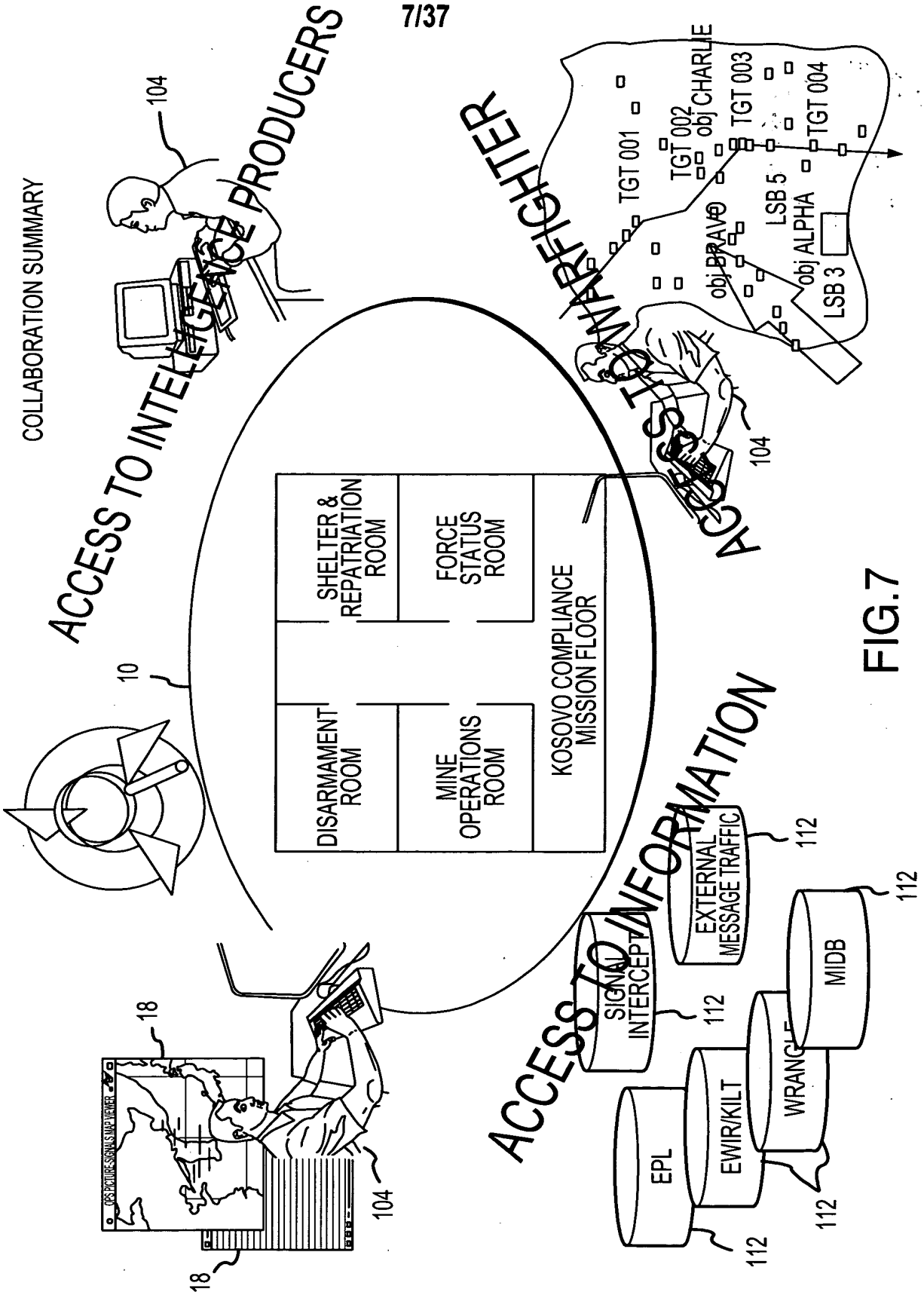

COLLABORATION SUMMARY
ACCESS TO INTELLIGENCE PRODUCERS
ACCESS TO WARFIGHTER
ACCESS TO INFORMATION
10
104
18
112
DISARMAMENT ROOM
MINE OPERATIONS ROOM
KOSOVO COMPLIANCE MISSION FLOOR
SHELTER & REPATRIATION ROOM
FORCE STATUS ROOM
TGT 001
TGT 002
obj CHARLIE
TGT 003
TGT 004
obj BRAVO
LSB 5
obj ALPHA
LSB 3
SIGNAL INTERCEPT
EXTERNAL MESSAGE TRAFFIC
MIDB
EPL
EWIR/KILT
WRANGLE

FIG.7

ARCHITECTURAL STRATEGY

KEY REFERENCE ARCHITECTURES
- OBJECT MANAGEMENT ARCHITECTURE (OMA)
  - OPENGIS, COSSERVICES
- COE LAYERED ARCHITECTURE
- UCA CRYPTOLOGIC FRAMEWORK
- USIGS
  - GIAS

KEY DATA MODELS
- SOM, MIDB, JCDB, ASAS, L245, ECDS, TEXTA

ARCHITECTURAL PATTERNS
- LAYERED ARCHITECTURE
- DATA CENTRIC ARCHITECTURE
  -INFORMATION MANAGEMENT FRAMEWORK
  -INTERACTIVE ANALYSIS FRAMEWORK
- MISSION MANAGEMENT ARCHITECTURE
  -TASK MANAGEMENT FRAMEWORK
  -RESOURCE MANAGEMENT FRAMEWORK

COTS SW INFRASTRUCTURE
- JAVA/C++
- CORBA
- ENTERPRISE JAVA BEANS
- RDBMS/ODBMS
- MICROSOFT WINDOWS
- WEB SERVER/BROWSER
- XML/DOM

COTS HW
- UNIX SMP SERVER
- NT WORKSTATIONS

FIG.8

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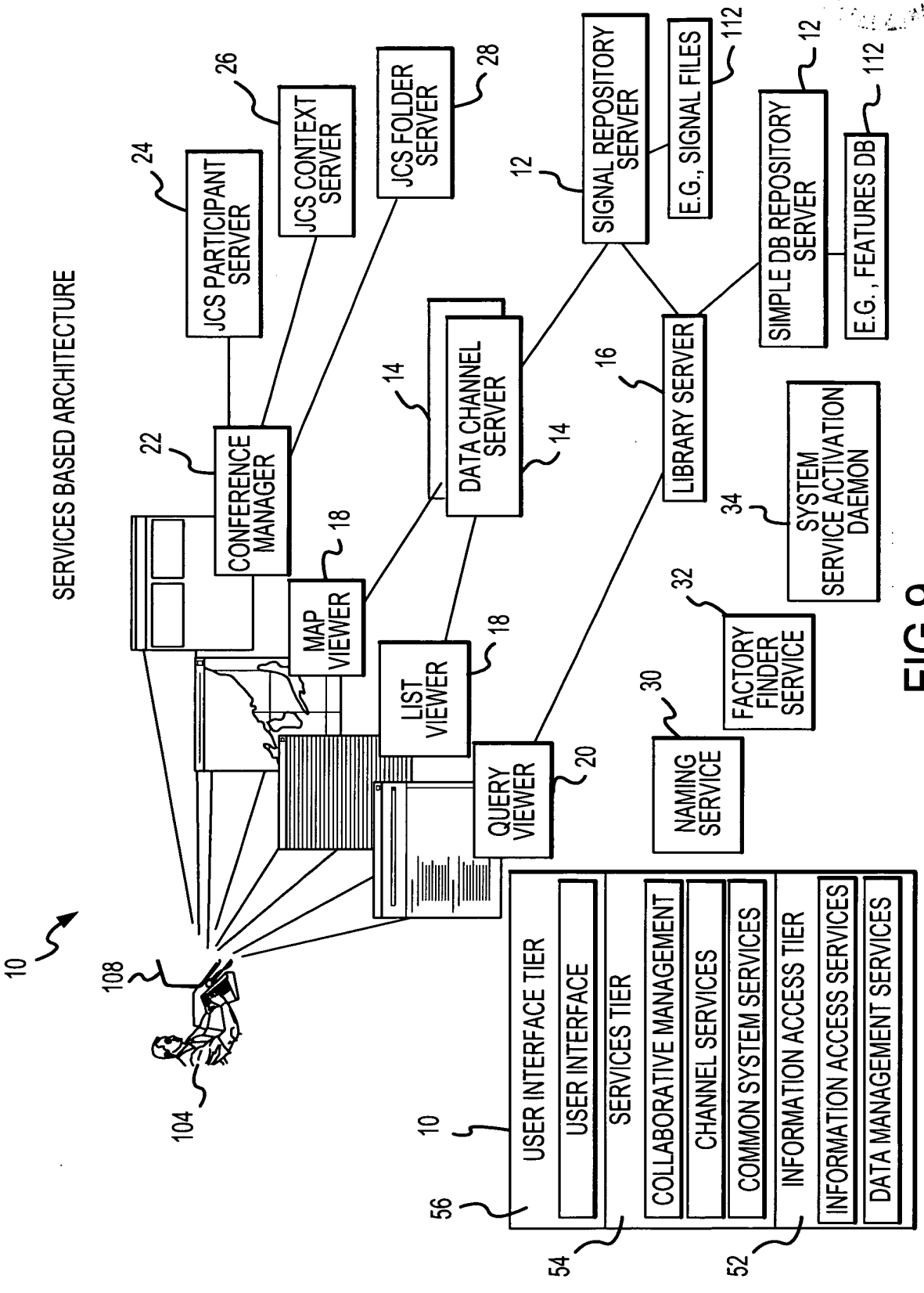
SERVICES BASED ARCHITECTURE
10
108
104
JCS PARTICIPANT SERVER
24
JCS CONTEXT SERVER
26
JCS FOLDER SERVER
28
SIGNAL REPOSITORY SERVER
12
E.G., SIGNAL FILES
112
SIMPLE DB REPOSITORY SERVER
12
E.G., FEATURES DB
112
CONFERENCE MANAGER
22
DATA CHANNEL SERVER
14
14
LIBRARY SERVER
16
SYSTEM SERVICE ACTIVATION DAEMON
34
MAP VIEWER
18
LIST VIEWER
18
QUERY VIEWER
20
FACTORY FINDER SERVICE
32
NAMING SERVICE
30
10
USER INTERFACE TIER
USER INTERFACE
56
SERVICES TIER
COLLABORATIVE MANAGEMENT
CHANNEL SERVICES
COMMON SYSTEM SERVICES
54
INFORMATION ACCESS TIER
INFORMATION ACCESS SERVICES
DATA MANAGEMENT SERVICES
52

FIG.9

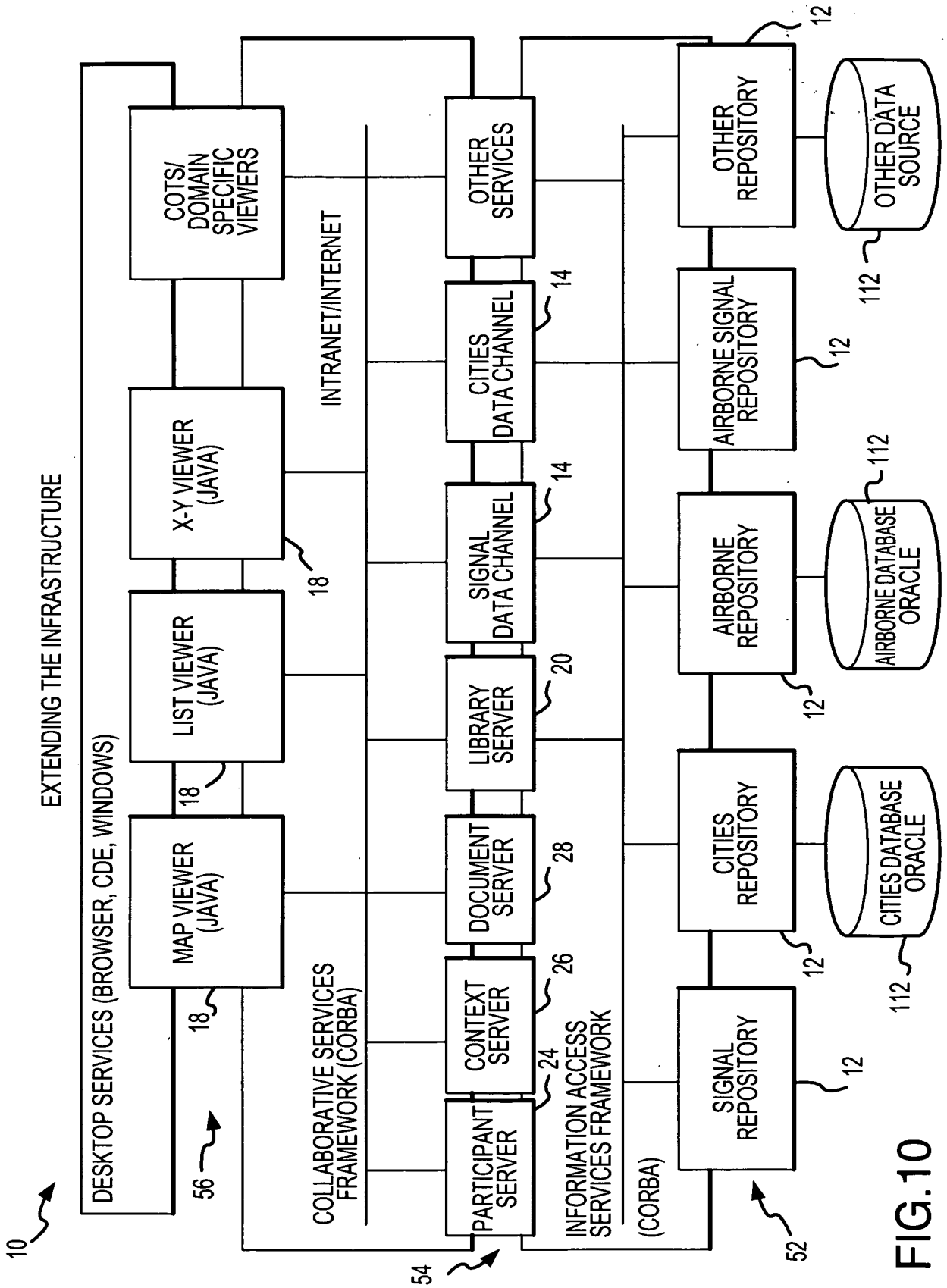
10
EXTENDING THE INFRASTRUCTURE
DESKTOP SERVICES (BROWSER, CDE, WINDOWS)
COTS/ DOMAIN SPECIFIC VIEWERS
X-Y VIEWER (JAVA)
LIST VIEWER (JAVA)
MAP VIEWER (JAVA)
18
56
INTRANET/INTERNET
COLLABORATIVE SERVICES FRAMEWORK (CORBA)
PARTICIPANT SERVER
CONTEXT SERVER
DOCUMENT SERVER
LIBRARY SERVER
SIGNAL DATA CHANNEL
CITIES DATA CHANNEL
OTHER SERVICES
14
20
28
26
24
54
INFORMATION ACCESS SERVICES FRAMEWORK (CORBA)
SIGNAL REPOSITORY
CITIES REPOSITORY
AIRBORNE REPOSITORY
AIRBORNE SIGNAL REPOSITORY
OTHER REPOSITORY
12
52
CITIES DATABASE ORACLE
AIRBORNE DATABASE ORACLE
OTHER DATA SOURCE
112

FIG.10

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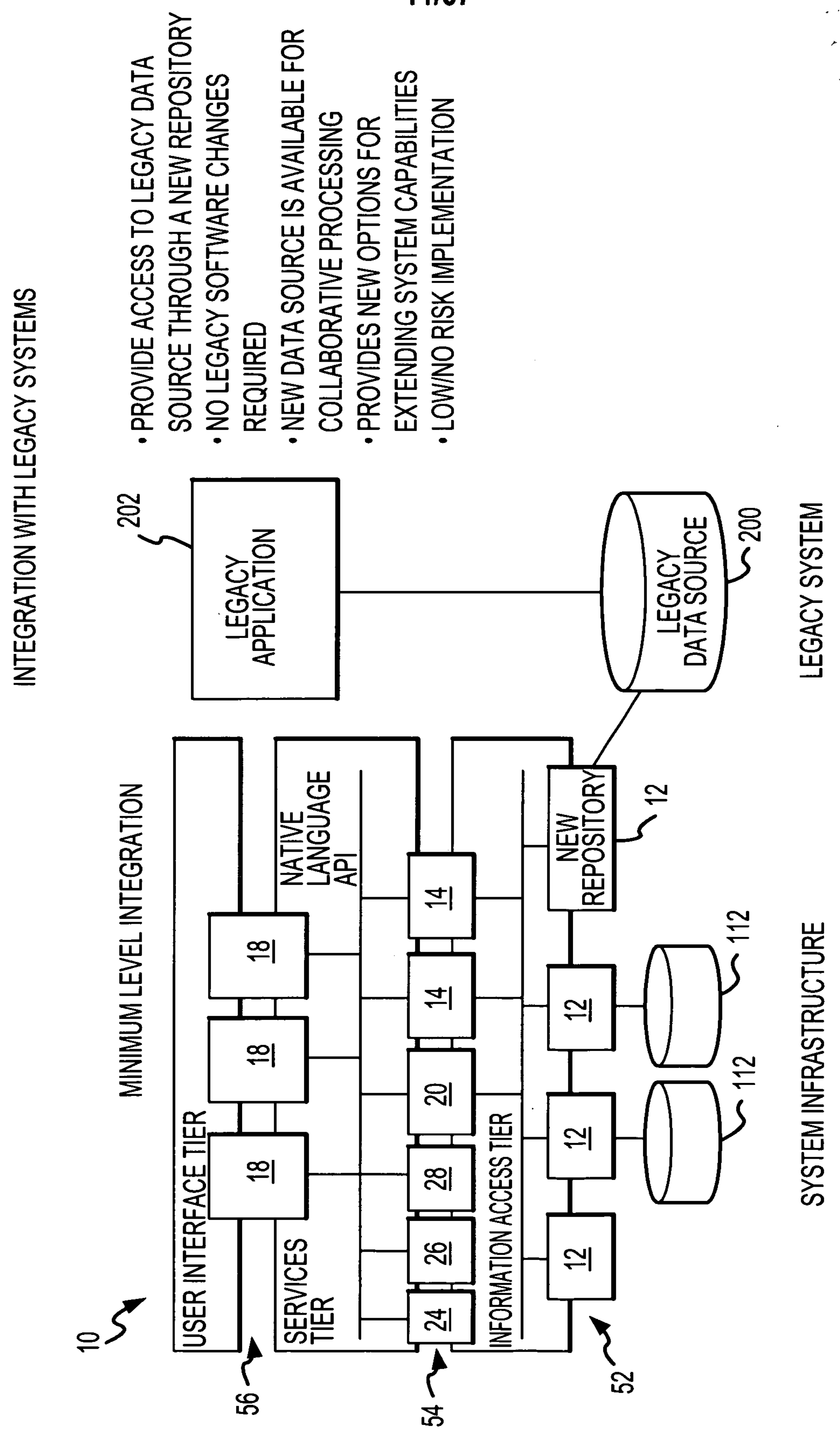
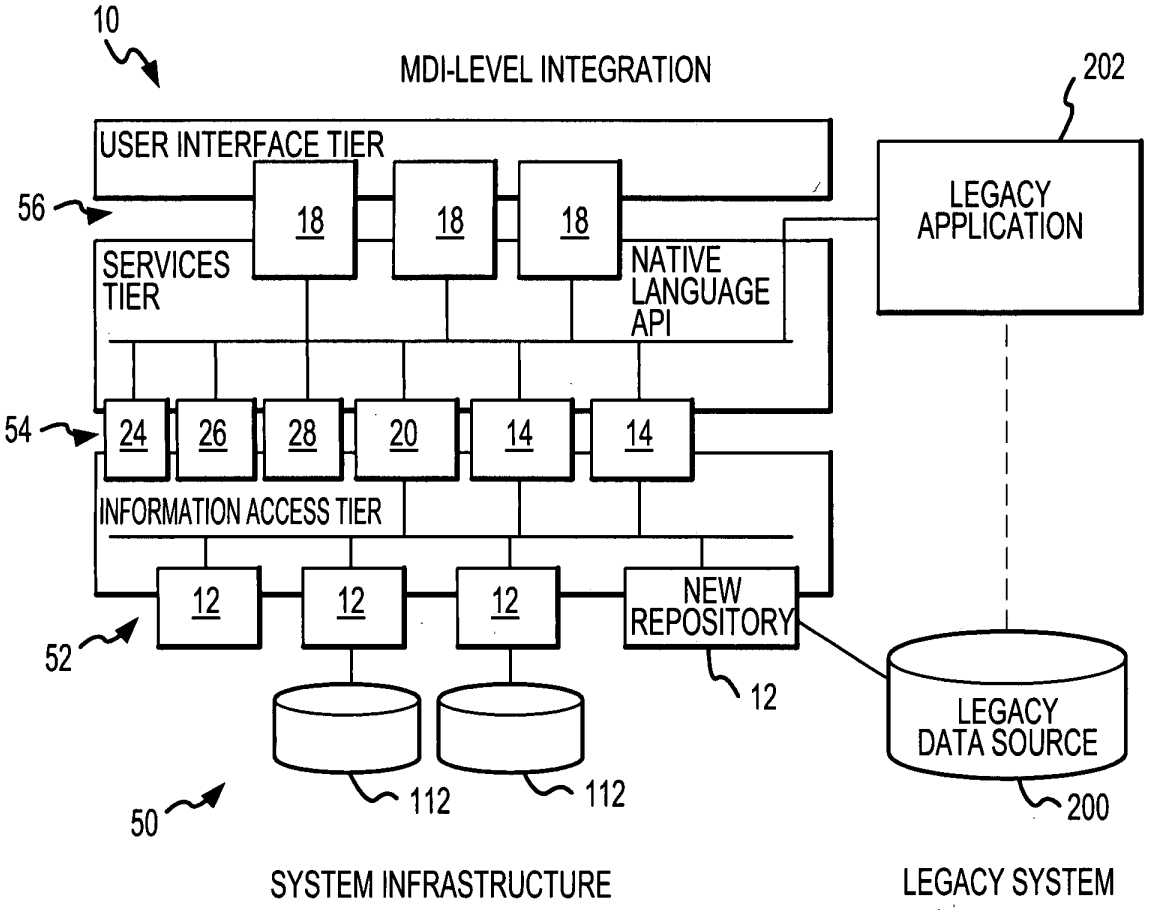

INTEGRATION WITH LEGACY SYSTEMS
• PROVIDE ACCESS TO LEGACY DATA SOURCE THROUGH A NEW REPOSITORY
• NO LEGACY SOFTWARE CHANGES REQUIRED
• NEW DATA SOURCE IS AVAILABLE FOR COLLABORATIVE PROCESSING
• PROVIDES NEW OPTIONS FOR EXTENDING SYSTEM CAPABILITIES
• LOW/NO RISK IMPLEMENTATION
MINIMUM LEVEL INTEGRATION
10
USER INTERFACE TIER
56
18
18
18
SERVICES TIER
54
24
26
28
20
14
14
NATIVE LANGUAGE API
INFORMATION ACCESS TIER
52
12
12
12
NEW REPOSITORY
12
112
112
SYSTEM INFRASTRUCTURE
202
LEGACY APPLICATION
LEGACY DATA SOURCE
200
LEGACY SYSTEM

FIG.11

INTEGRATION WITH LEGACY SYSTEMS



- ACCESS DATA THROUGH TSUNAMI INFRASTRUCTURE
- LEGACY VIEWERS ARE NOW INTERACT COLLABORATIVELY
- STILL MAINTAIN THE OPTION TO INTERACT DIRECTLY WITH THE DATA SOURCE
- PROVIDES ADDITIONAL OPTIONS FOR EXTENDING SYSTEM CAPABILITIES

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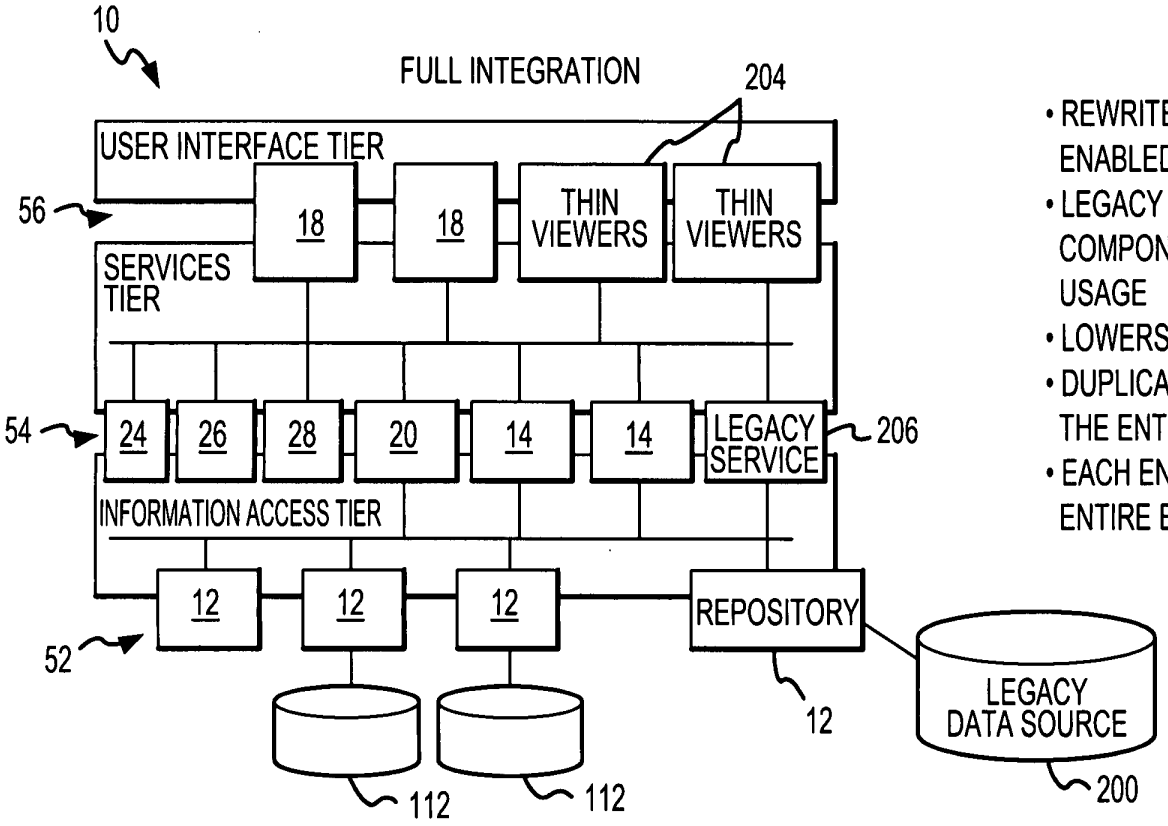
FIG.12

INTEGRATION WITH LEGACY SYSTEMS



- REWRITE VIEWERS IN JAVA MAKING THEM WEB-ENABLED AND MACHINE INDEPENDENT
- LEGACY PROCESSING BECOMES A SYSTEM COMPONENT AVAILABLE FOR ENTERPRISE USAGE
- LOWERS MAINTENANCE COST
- DUPLICATE FUNCTIONALITY REMOVED ACROSS THE ENTERPRISE
- EACH ENHANCEMENT IS AVAILABLE TO THE ENTIRE ENTERPRISE

FIG.13

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Attorney: Robert B. Berube, Tel: (303) 338-0997

IMPORTANCE OF DATA-CENTRIC COLLABORATION FRAMEWORK

- FRAMEWORK IS APPLICABLE TO MOST DOMAINS
- SMALL TOOLS EXTEND OVERALL CAPABILITY
  - -BUILD DOMAIN OR ANALYST SPECIFIC TOOLS---NOT SYSTEMS
  - -ADDING SINGLE COLLABORATIVE CAPABILITIES RESULTS IN EXPONENTIAL GROWTH OF OVERALL SYSTEM CAPABILITY
- COLLABORATION INTEGRAL TO FRAMEWORK
  - -INSTEAD Of PASTING IMAGES ONTO A WHITEBOARD, COLLABORATE ON THE TOOL ITSELF USING WHITEBOARDING LAYER
  - -NO SPECIAL LOGIC NEEDED IN TOOLS TO SUPPORT COLLABORATION
- SUPPORTS LEGACY APPLICATIONS
  - -DATA IS SHARED AND NOT REPLICATED, SO CHANGES TO THE DATA BY LEGACY TOOLS PROPAGATE TO COLLABORATIVE TOOLS.

FIG.14

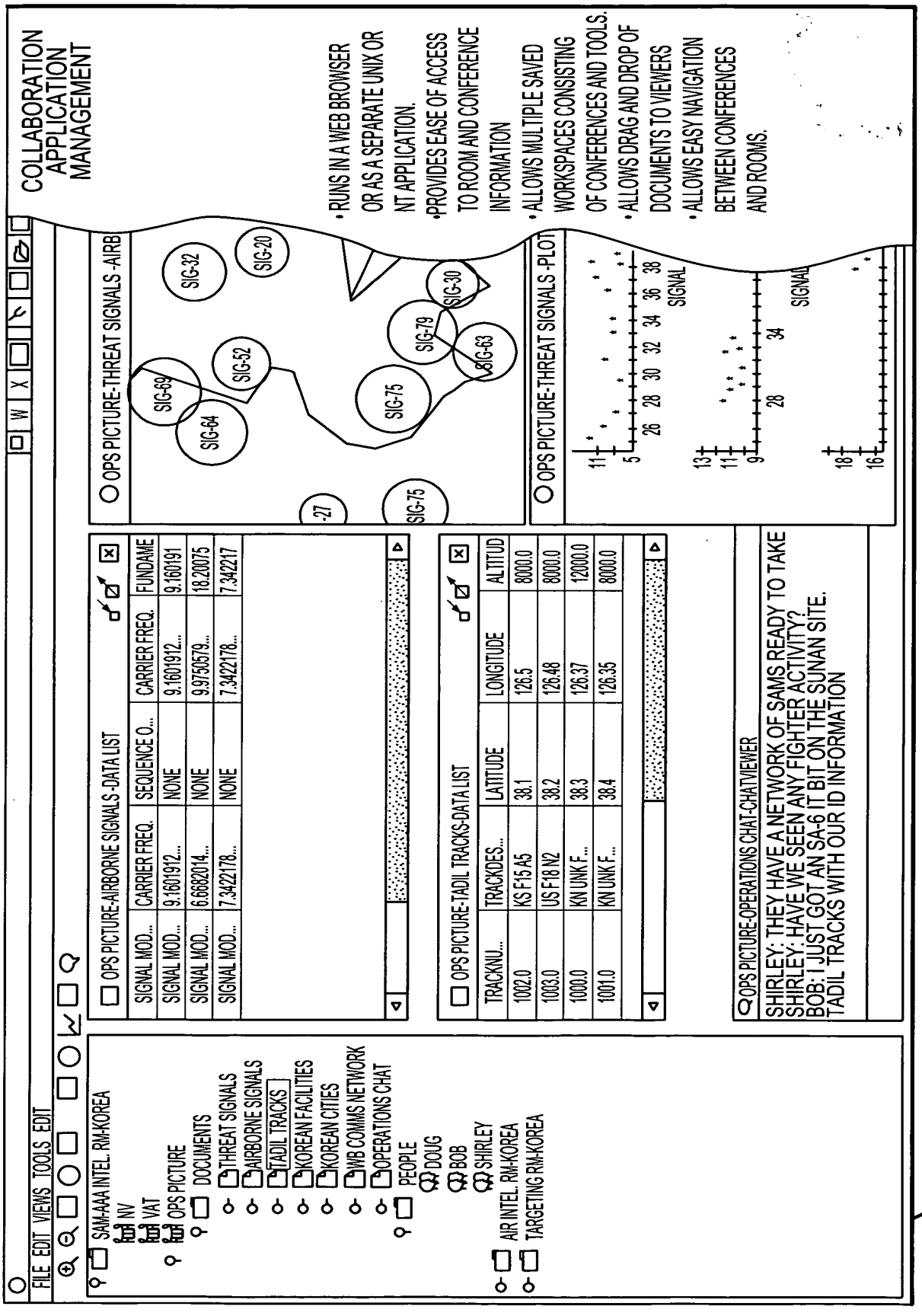
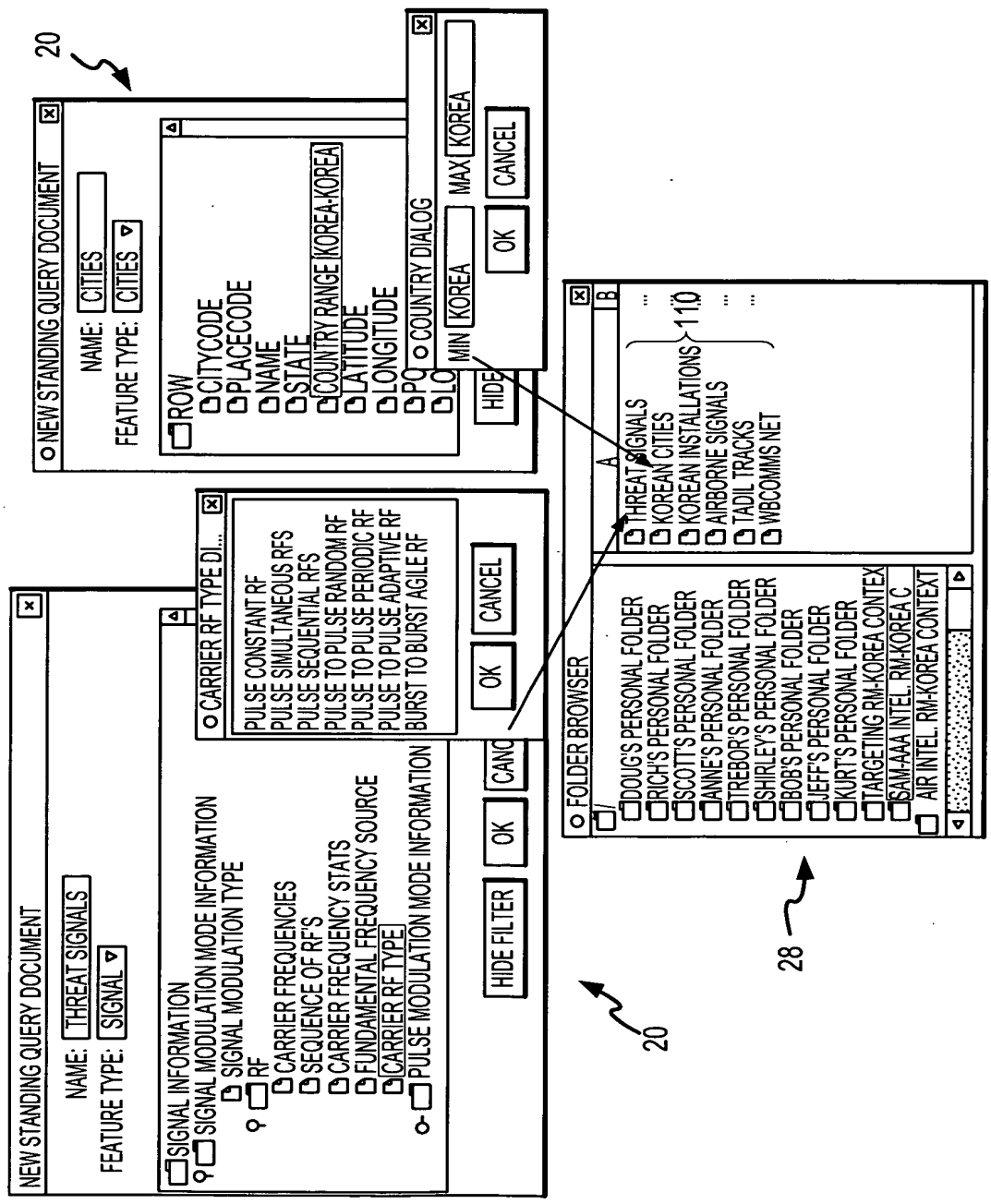

COLLABORATION APPLICATION MANAGEMENT
FILE EDIT VIEWS TOOLS EDIT
SAM-AAA INTEL RM-KOREA
NV
VAT
OPS PICTURE
DOCUMENTS
THREAT SIGNALS
AIRBORNE SIGNALS
TADIL TRACKS
KOREAN FACILITIES
KOREAN CITIES
WB COMMS NETWORK
OPERATIONS CHAT
PEOPLE
DOUG
BOB
SHIRLEY
AIR INTEL RM-KOREA
TARGETING RM-KOREA
OPS PICTURE-AIRBORNE SIGNALS -DATA LIST
SIGNAL MOD... CARRIER FREQ. SEQUENCE O... CARRIER FREQ. FUNDAME
SIGNAL MOD... 9.1601912... NONE 9.1601912... 9.160191
SIGNAL MOD... 6.6682014... NONE 9.9750579... 18.20075
SIGNAL MOD... 7.3422178... NONE 7.3422178... 7.342217
OPS PICTURE-TADIL TRACKS-DATA LIST
TRACKNU... TRACKDES... LATITUDE LONGITUDE ALTITUD
1002.0 KS F15 A5 38.1 126.5 8000.0
1003.0 US F18 N2 38.2 126.48 8000.0
1000.0 KN UNK F... 38.3 126.37 12000.0
1001.0 KN UNK F... 38.4 126.35 8000.0
OPS PICTURE-AIRB
SIG-69
SIG-64
SIG-52
SIG-32
SIG-20
SIG-30
SIG-79
SIG-63
SIG-75
SIG-75
-27
OPS PICTURE-THREAT SIGNALS -PLOT
SIGNAL
SIGNAL
OPS PICTURE-OPERATIONS CHAT-CHATVIEWER
SHIRLEY: THEY HAVE A NETWORK OF SAMS READY TO TAKE
SHIRLEY: HAVE WE SEEN ANY FIGHTER ACTIVITY?
BOB: I JUST GOT AN SA-6 IT BIT ON THE SUNAN SITE.
TADIL TRACKS WITH OUR ID INFORMATION
•RUNS IN A WEB BROWSER OR AS A SEPARATE UNIX OR NT APPLICATION.
•PROVIDES EASE OF ACCESS TO ROOM AND CONFERENCE INFORMATION
•ALLOWS MULTIPLE SAVED WORKSPACES CONSISTING OF CONFERENCES AND TOOLS.
•ALLOWS DRAG AND DROP OF DOCUMENTS TO VIEWERS
•ALLOWS EASY NAVIGATION BETWEEN CONFERENCES AND ROOMS.
60

FIG.15

COLLABORATIVE APPLICATION MANAGEMENT

FIG.16

DYNAMIC REPOSITORY QUERY & DOCUMENT MANAGEMENT



- DYNAMICALLY LEARNS ABOUT REPOSITORY
- GETS ATTRIBUTE METADATA FROM REPOSITORY
- CREATES AGENT REPRESENTING STANDING QUERY
- RESULTS BECOME A DOCUMENT WHICH MAY BE USED FOR COLLABORATION

FIG.17

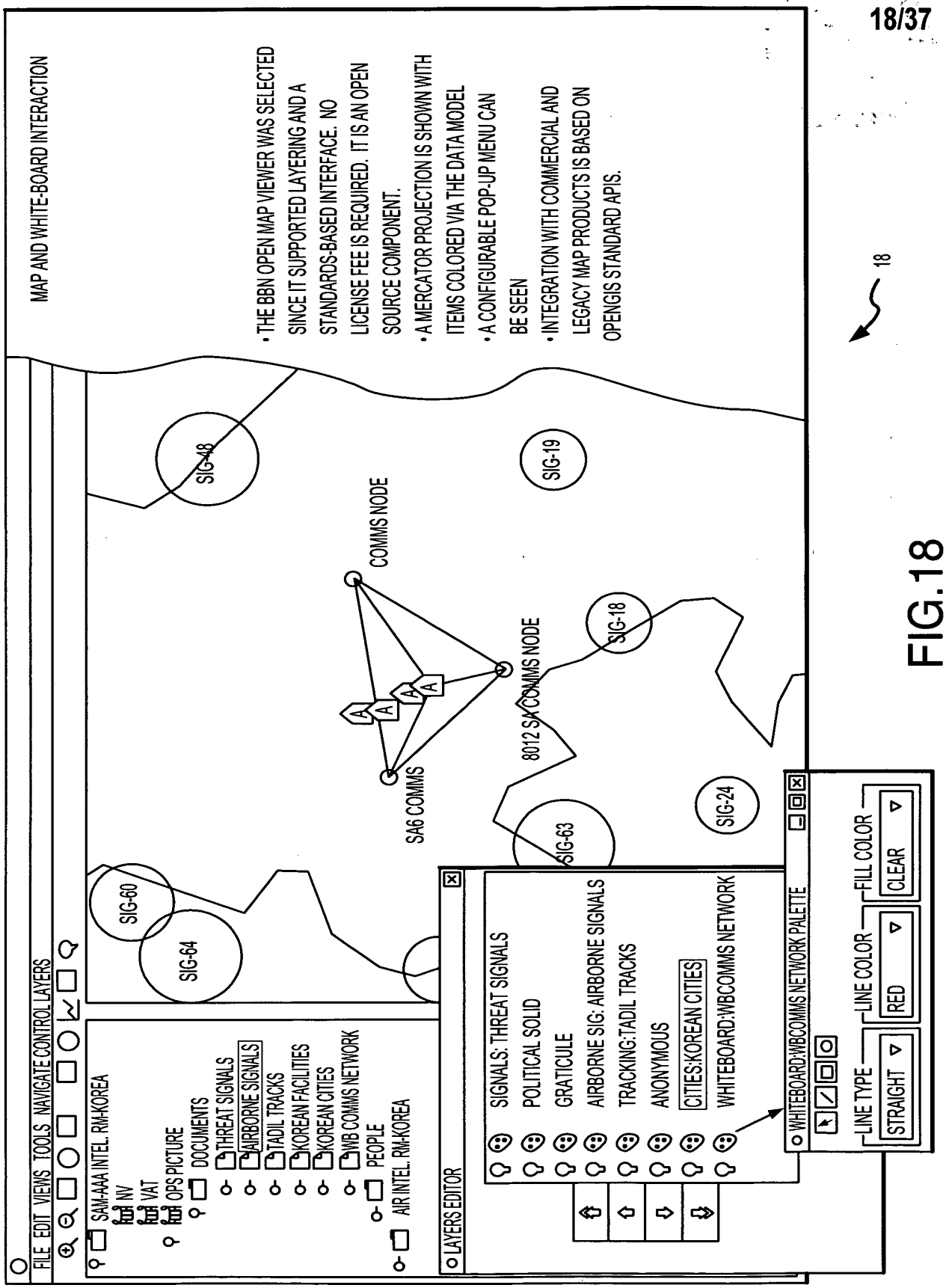

MAP AND WHITE-BOARD INTERACTION
• THE BBN OPEN MAP VIEWER WAS SELECTED SINCE IT SUPPORTED LAYERING AND A STANDARDS-BASED INTERFACE. NO LICENSE FEE IS REQUIRED. IT IS AN OPEN SOURCE COMPONENT.
• A MERCATOR PROJECTION IS SHOWN WITH ITEMS COLORED VIA THE DATA MODEL
• A CONFIGURABLE POP-UP MENU CAN BE SEEN
• INTEGRATION WITH COMMERCIAL AND LEGACY MAP PRODUCTS IS BASED ON OPENGIS STANDARD APIS.
18
FILE EDIT VIEWS TOOLS NAVIGATE CONTROL LAYERS
SAM-AAA INTEL RM-KOREA
NV
VAT
OPS PICTURE
DOCUMENTS
THREAT SIGNALS
AIRBORNE SIGNALS
TADIL TRACKS
KOREAN FACILITIES
KOREAN CITIES
WB COMMS NETWORK
PEOPLE
AIR INTEL RM-KOREA
LAYERS EDITOR
SIGNALS: THREAT SIGNALS
POLITICAL SOLID
GRATICULE
AIRBORNE SIG: AIRBORNE SIGNALS
TRACKING:TADIL TRACKS
ANONYMOUS
CITIES:KOREAN CITIES
WHITEBOARD:WBCOMMS NETWORK
WHITEBOARD:WBCOMMS NETWORK PALETTE
LINE TYPE
STRAIGHT
LINE COLOR
RED
FILL COLOR
CLEAR
SIG-48
SIG-19
COMMS NODE
SIG-18
8012 SA COMMS NODE
SA6 COMMS
SIG-60
SIG-64
SIG-63
SIG-24

FIG.18

EXTENDED PROPERTIES EDITOR

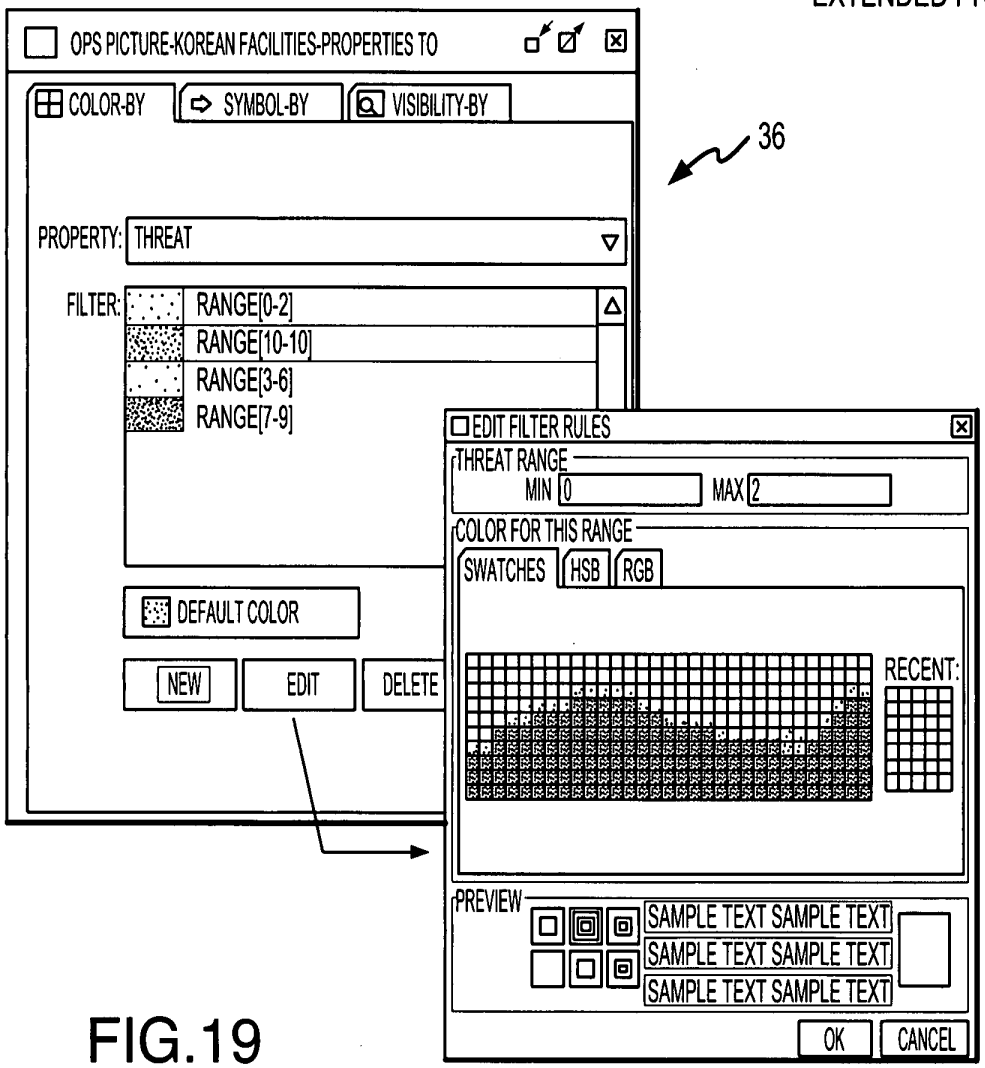


FIG.19

- DYNAMICALLY LEARNS INFORMATION SCHEMA FROM REPOSITORY
- ATTACHES EXTENDED PROPERTIES DATA IN THE DATA CHANNEL
- APPLIED RULES RUN AS AGENTS WITHIN THE CHANNEL
- EXTENDED PROPERTIES
  -COLOR
  -HIGHLIGHT
  -VISIBILITY
  -LABEL
  -SYMBOL
  -.....

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X-Y PLOTTER

- SELECT X AND Y ATTRIBUTES FROM LIST PROVIDED BY REPOSITORY
- RE-ORDER DISPLAYS
- ZOOM/PAN IN ANY DISPLAY INDEPENDENTLY OR DEPENDENTLY

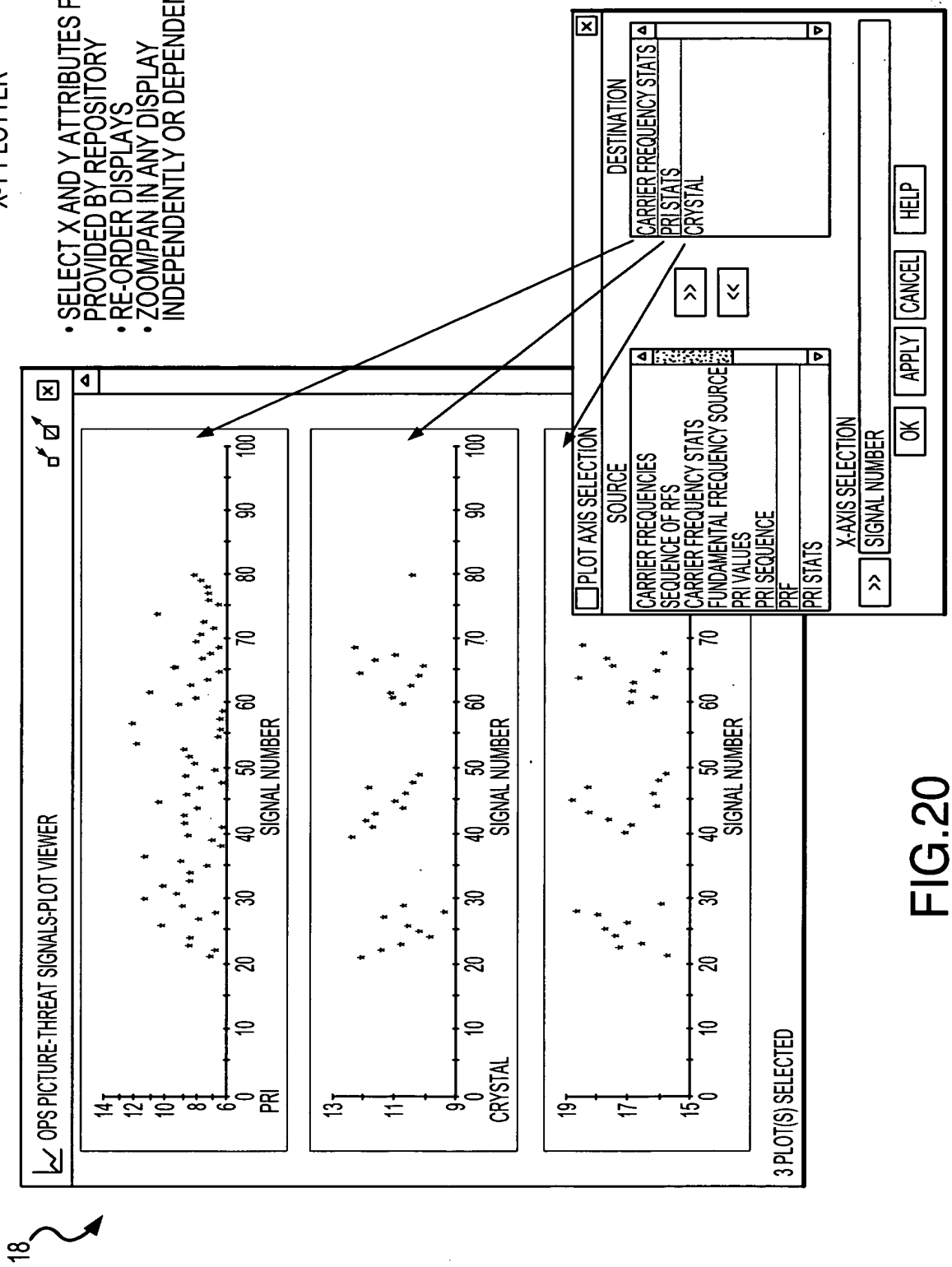

FIG.20

18

LIST VIEWER

OPSPICTURE-KOREANFACILITIES-DATALIST

SITECODE	NAME	COUNTRY	LATITUDE	LONGITUDE	THREAT
KN00657	CHOOK	KN	39.233333	127.05	3
KN00561	CH'ILTAE	KN	39.466667	127.05	6
KN00017	P'ALBONG	KN	39.416667	127.066667	4
KN00492	CH'ANGMOK	KN	39.433333	127.066667	5
KN00250	ISDU	KN	39.562315	127.083333	8
KN00228	PYONGSAN	KN	39.233333	127.1	0
SC00002	232 AIR CO	KN	38.4	127.1	10
KN00380	PYONGP'UN	KN	39.983333	127.133333	4
KN00227	PYONGSANG	KN	39.966667	127.166667	6
KN00241	PAEAM	KN	39.683333	127.183333	5
KN00242	PAEBAWL	KN	39.683333	127.183333	4
KN00250	CHOOOMIN	KN	17.430562	127.9	8
KN00296	PAEKKONG	KN	38.466667	126.566667	1
KN00478	CH'ANGGYE	KN	39.466667	126.566667	2
KN00044	P'ANMUU	KN	37.895555	126.564555	8
KN00045	RASDASS	KN	38.956546	127.566667	7
KN00292	PAEKHWAD	KN	37.95	126.583333	6
KN00425	CH'AERYON	KN	37.833333	126.6	2
KN00257	PAEGO	KN	38.433333	126.6	1
KN00521	CH'ARYONG	KN	39.366667	126.6	2
SC00004	BQ12YSA	KN	37.8	126.6	10
KN00030	P'ANCH'ON	KN	37.8	126.633333	5
KN00712	CHODEDAM	KN	39.56	126.633333	7
KN00019	P'ALCHACH'ON	KN	37.966667	126.633333	3
KN00323	PAEKTONGUM	KN	37.933333	126.65	4
KN00103	PONGAM	KN	38.965333	126.65	8
KN00493	CH'ANGNAE	KN	37.833333	126.666667	4
KN00195	PYONGCH'A	KN	37.916667	126.666667	4

- SORTING
- ROW SELECTION
- ROW COLORING
- ROW HIDING
- CHOOSE ATTRIBUTES TO VIEW

FIG.21

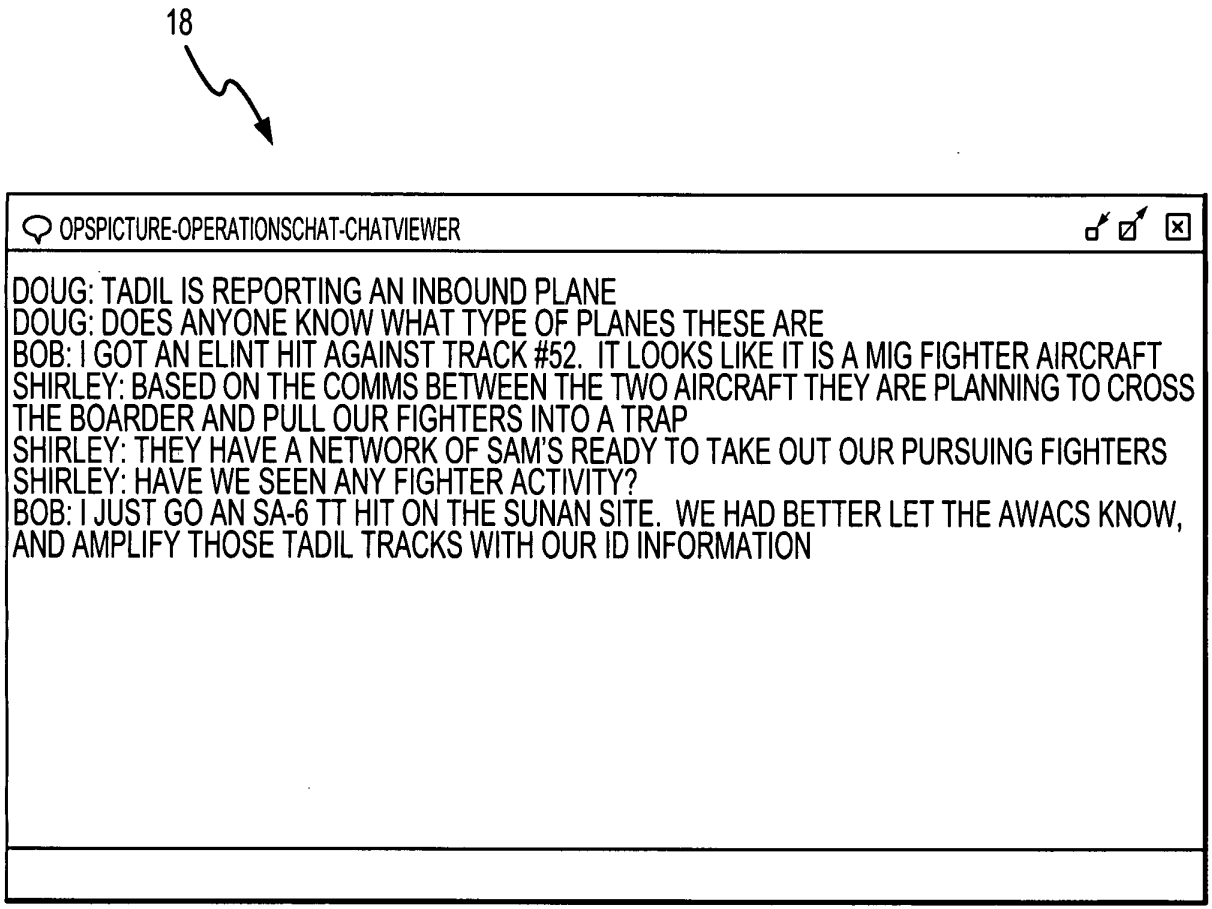

FIG.22

CHAT TOOL

- CHAT SUPPORTS MULTIUSER CONVERSATIONS FROM MULTIPLE CONFERENCES IN MULTIPLE CONTEXTS
- PEOPLE CONNECT TO A DOCUMENT AND COMMUNICATE
- PEOPLE IN THE SAME CONFERENCE SEE THE SAME VISUALIZATION PROPERTIES LIKE COLOR AND VISIBILITY OF PARTICIPANTS INPUTS
- CONVERSATIONS ARE PERSISTENT OVER TIME

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Docket No.: 41992-00405
Attorney: Robert B. Berube, Tel: (303) 338-0997

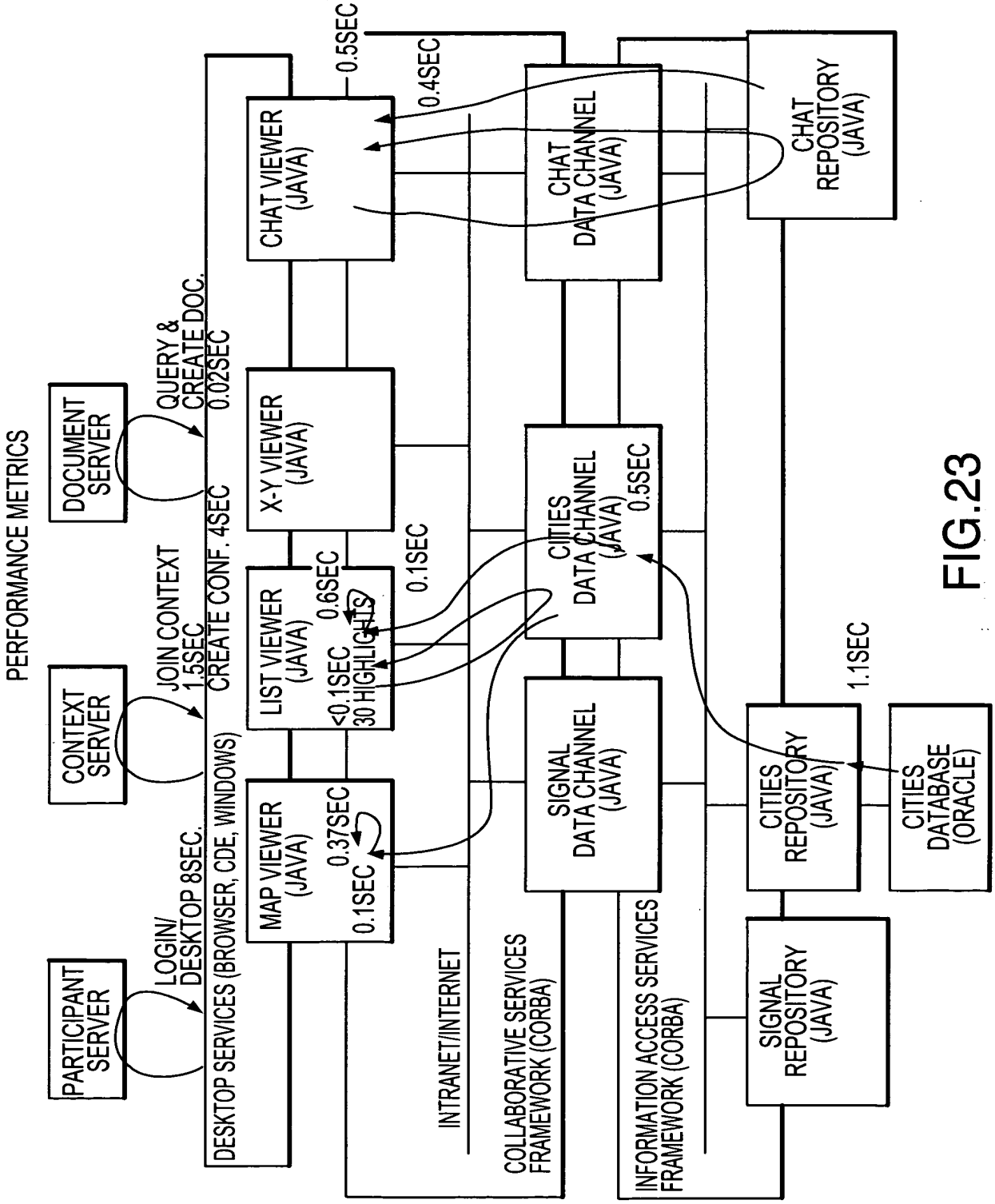

PERFORMANCE METRICS
PARTICIPANT SERVER
CONTEXT SERVER
DOCUMENT SERVER
LOGIN/ DESKTOP 8SEC.
JOIN CONTEXT 1.5SEC
QUERY & CREATE DOC. 0.02SEC
CREATE CONF. 4SEC
DESKTOP SERVICES (BROWSER, CDE, WINDOWS)
MAP VIEWER (JAVA)
0.37SEC
0.1SEC
LIST VIEWER (JAVA)
0.6SEC
<0.1SEC 30 HIGHLIGHTS
X-Y VIEWER (JAVA)
0.1SEC
CHAT VIEWER (JAVA)
0.5SEC
0.4SEC
INTRANET/INTERNET
COLLABORATIVE SERVICES FRAMEWORK (CORBA)
SIGNAL DATA CHANNEL (JAVA)
CITIES DATA CHANNEL (JAVA)
0.5SEC
CHAT DATA CHANNEL (JAVA)
INFORMATION ACCESS SERVICES FRAMEWORK (CORBA)
SIGNAL REPOSITORY (JAVA)
CITIES REPOSITORY (JAVA)
1.1SEC
CITIES DATABASE (ORACLE)
CHAT REPOSITORY (JAVA)

FIG.23

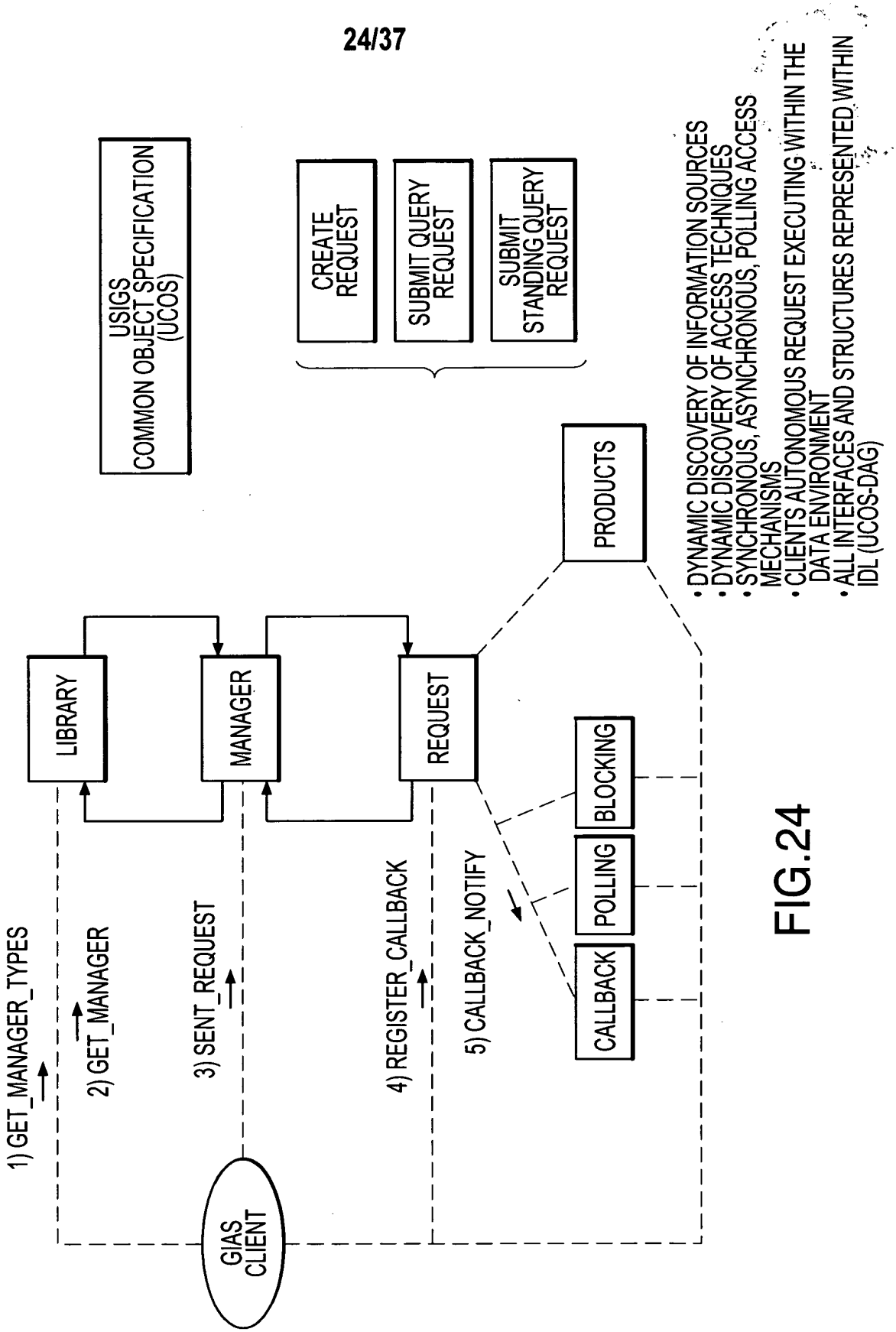

USIGS-GEOSPATIAL AND IMAGERY ACCESS SERVICES SPECIFICATION
USIGS COMMON OBJECT SPECIFICATION (UCOS)
CREATE REQUEST
SUBMIT QUERY REQUEST
SUBMIT STANDING QUERY REQUEST
PRODUCTS
LIBRARY
MANAGER
REQUEST
BLOCKING
POLLING
CALLBACK
GIAS CLIENT
1) GET_MANAGER_TYPES
2) GET_MANAGER
3) SENT_REQUEST
4) REGISTER_CALLBACK
5) CALLBACK_NOTIFY
• DYNAMIC DISCOVERY OF INFORMATION SOURCES
• DYNAMIC DISCOVERY OF ACCESS TECHNIQUES
• SYNCHRONOUS, ASYNCHRONOUS, POLLING ACCESS MECHANISMS
• CLIENTS AUTONOMOUS REQUEST EXECUTING WITHIN THE DATA ENVIRONMENT
• ALL INTERFACES AND STRUCTURES REPRESENTED WITHIN IDL (UCOS-DAG)

FIG.24

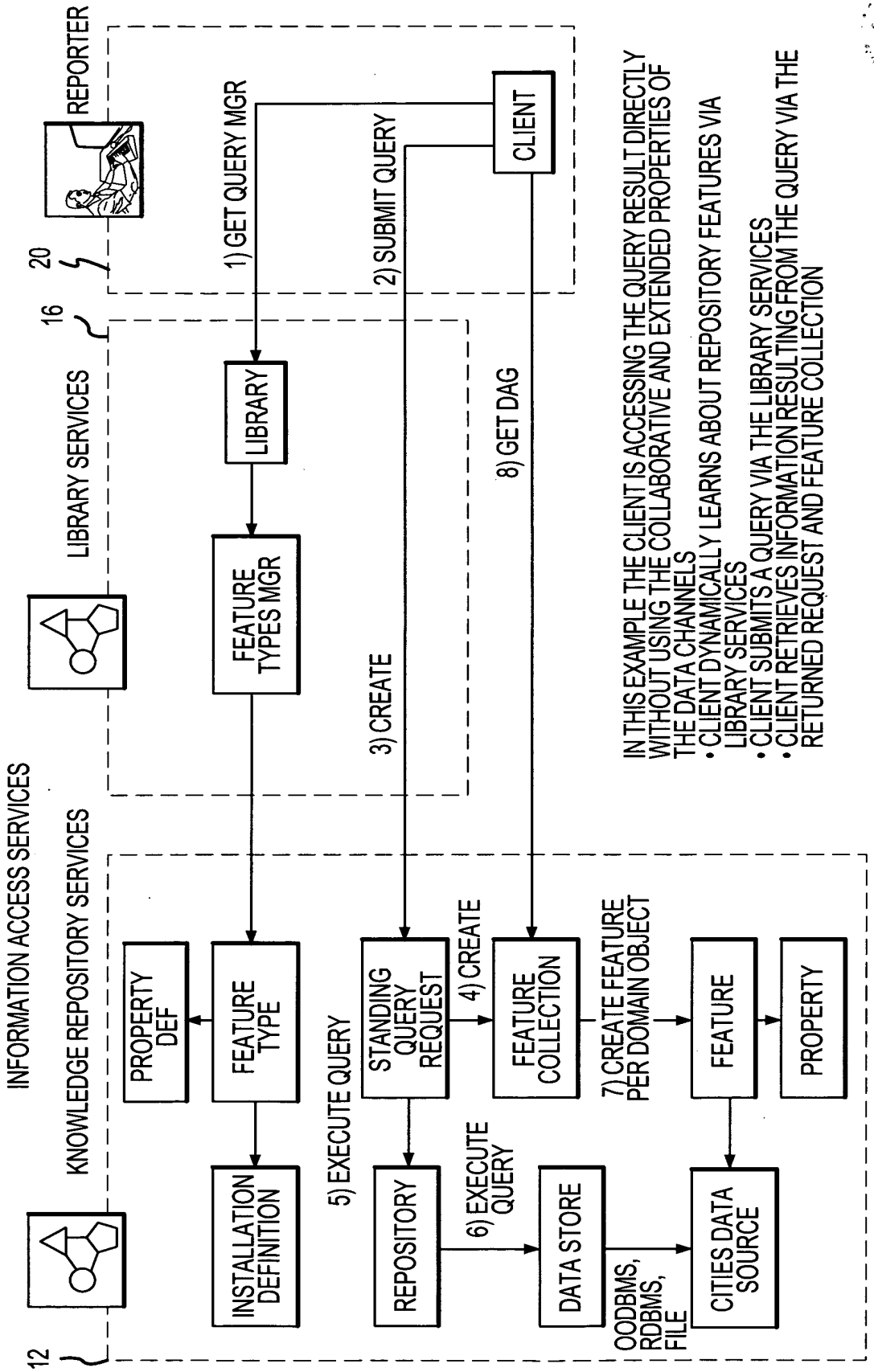

REPORTER
20
1) GET QUERY MGR
2) SUBMIT QUERY
CLIENT
16
LIBRARY SERVICES
LIBRARY
FEATURE TYPES MGR
3) CREATE
8) GET DAG
IN THIS EXAMPLE THE CLIENT IS ACCESSING THE QUERY RESULT DIRECTLY WITHOUT USING THE COLLABORATIVE AND EXTENDED PROPERTIES OF THE DATA CHANNELS
• CLIENT DYNAMICALLY LEARNS ABOUT REPOSITORY FEATURES VIA LIBRARY SERVICES
• CLIENT SUBMITS A QUERY VIA THE LIBRARY SERVICES
• CLIENT RETRIEVES INFORMATION RESULTING FROM THE QUERY VIA THE RETURNED REQUEST AND FEATURE COLLECTION
INFORMATION ACCESS SERVICES
KNOWLEDGE REPOSITORY SERVICES
PROPERTY DEF
FEATURE TYPE
STANDING QUERY REQUEST
4) CREATE
FEATURE COLLECTION
7) CREATE FEATURE PER DOMAIN OBJECT
FEATURE
PROPERTY
5) EXECUTE QUERY
INSTALLATION DEFINITION
REPOSITORY
6) EXECUTE QUERY
DATA STORE
OODBMS, RDBMS, FILE
CITIES DATA SOURCE
12

FIG.25

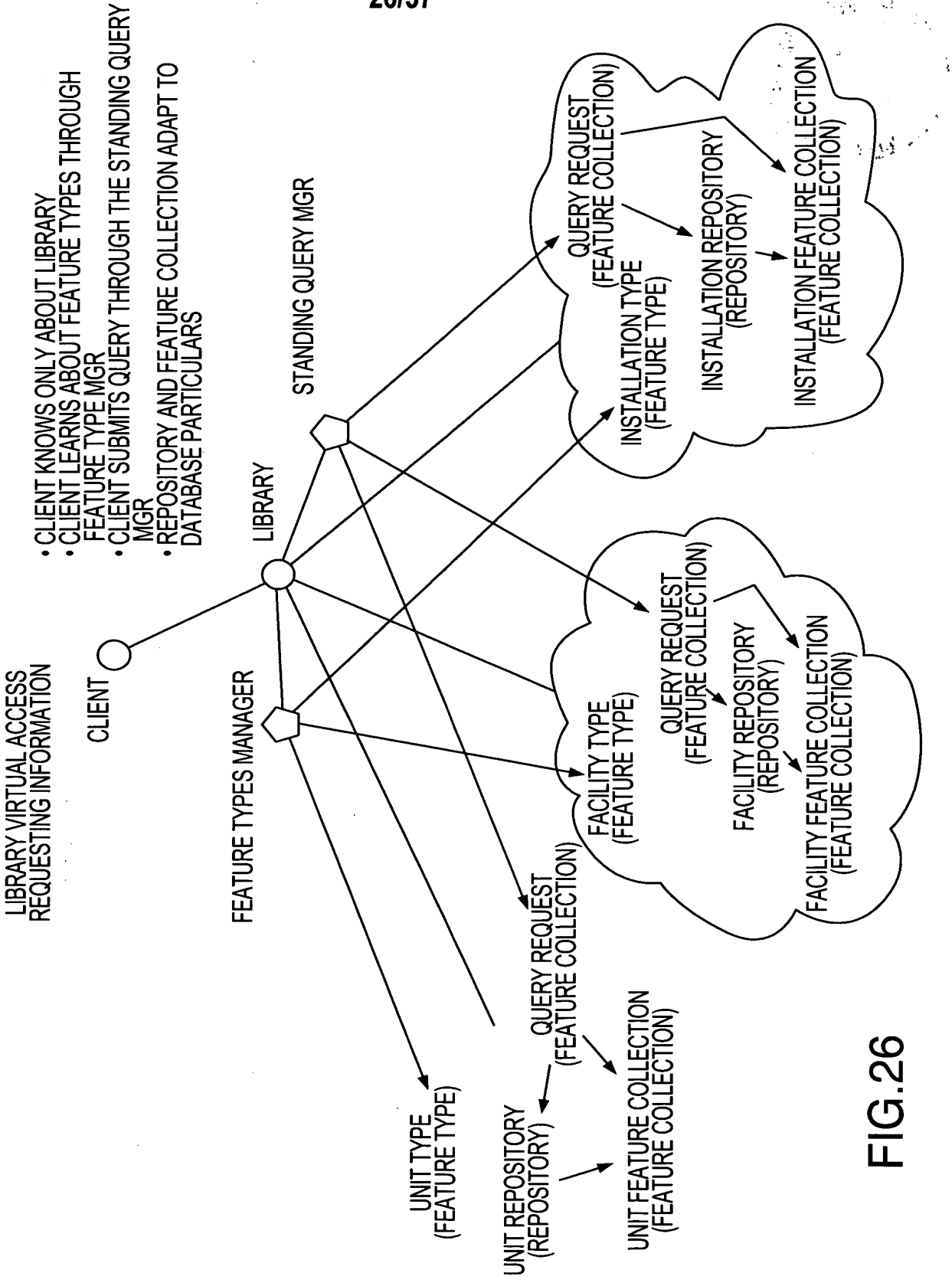
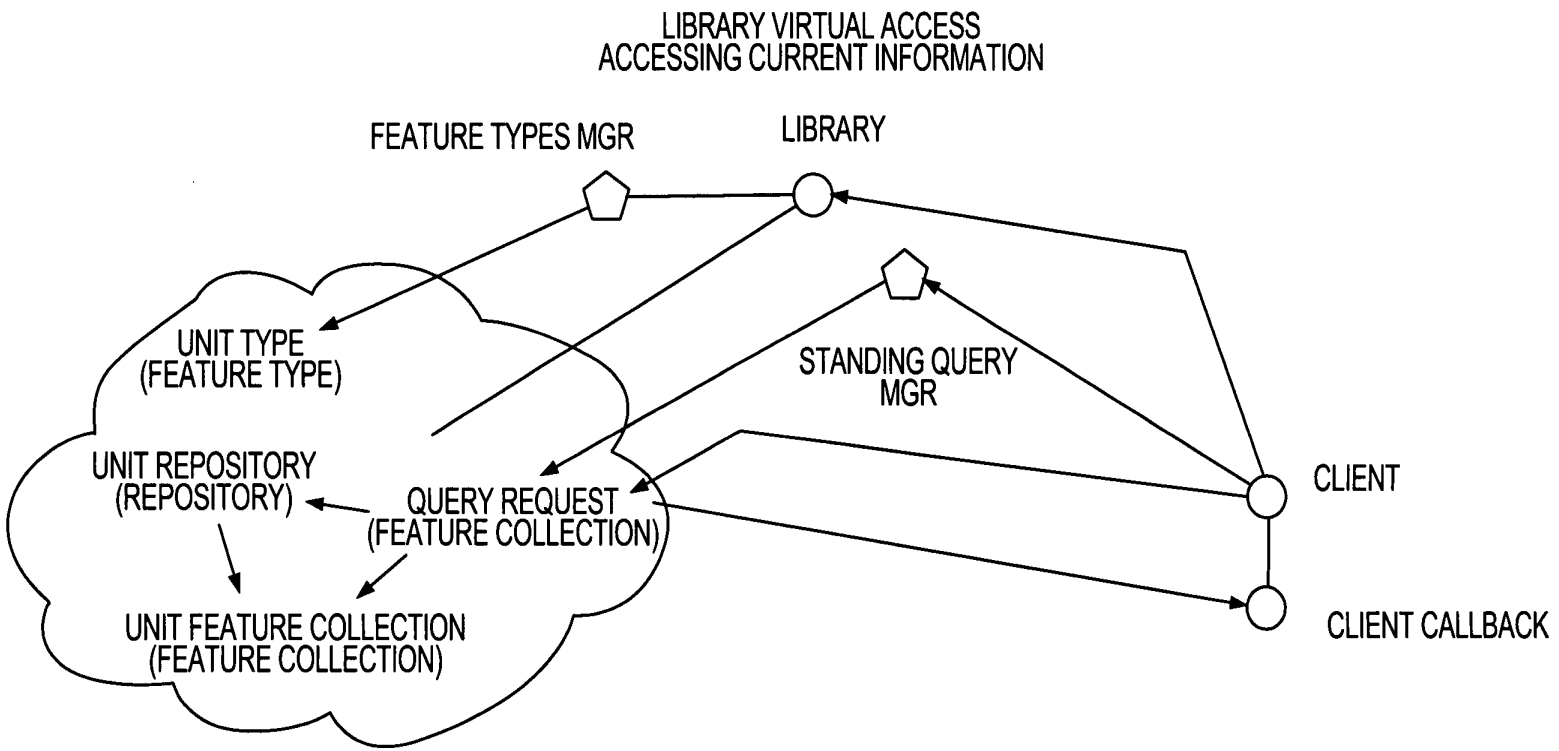

LIBRARY VIRTUAL ACCESS REQUESTING INFORMATION
CLIENT
• CLIENT KNOWS ONLY ABOUT LIBRARY
• CLIENT LEARNS ABOUT FEATURE TYPES THROUGH FEATURE TYPE MGR
• CLIENT SUBMITS QUERY THROUGH THE STANDING QUERY MGR
• REPOSITORY AND FEATURE COLLECTION ADAPT TO DATABASE PARTICULARS
LIBRARY
STANDING QUERY MGR
FEATURE TYPES MANAGER
QUERY REQUEST (FEATURE COLLECTION)
INSTALLATION TYPE (FEATURE TYPE)
INSTALLATION REPOSITORY (REPOSITORY)
INSTALLATION FEATURE COLLECTION (FEATURE COLLECTION)
QUERY REQUEST (FEATURE COLLECTION)
FACILITY TYPE (FEATURE TYPE)
FACILITY REPOSITORY (REPOSITORY)
FACILITY FEATURE COLLECTION (FEATURE COLLECTION)
QUERY REQUEST (FEATURE COLLECTION)
UNIT TYPE (FEATURE TYPE)
UNIT REPOSITORY (REPOSITORY)
UNIT FEATURE COLLECTION (FEATURE COLLECTION)

FIG.26



- CLIENT LEARNS ABOUT STANDING QUERY MGR THROUGH LIBRARY
- QUERY MANAGER RETURNS A REFERENCE TO A REQUEST OBJECT FOR EACH CLIENT QUERY METHOD INVOCATION
- CLIENT INTERACTS WITH REQUEST FOR QUERY CONTROL AND STATUS
- REQUEST SUPPORTS SYNCHRONOUS, POLLING, AND A-SYNCHRONOUS CLIENT INTERFACES. CLIENT CALLBACK IS USED FOR A-SYNCHRONOUS FEEDBACK ON QUERY STATE

FIG.27

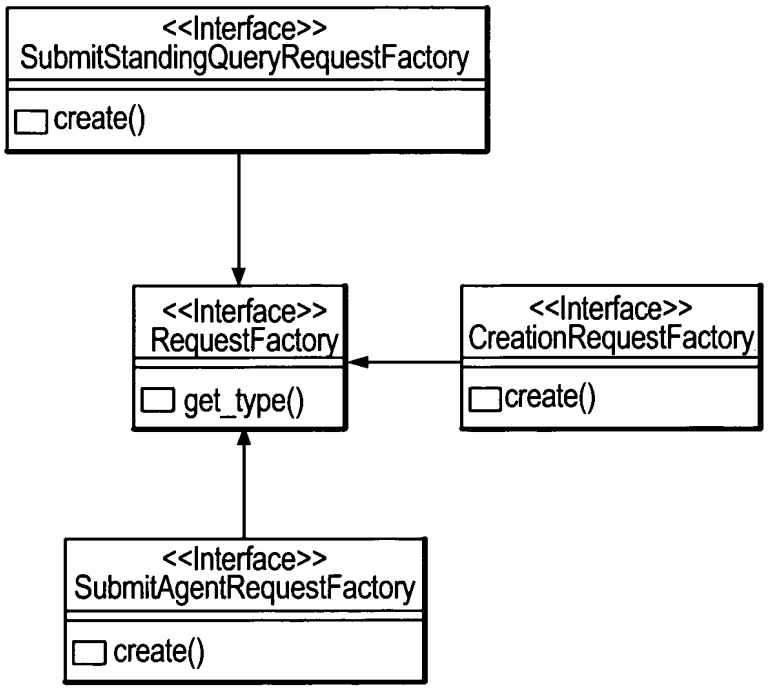

<<Interface>>
SubmitStandingQueryRequestFactory
create()
<<Interface>>
RequestFactory
get_type()
<<Interface>>
CreationRequestFactory
create()
<<Interface>>
SubmitAgentRequestFactory
create()

FIG.28

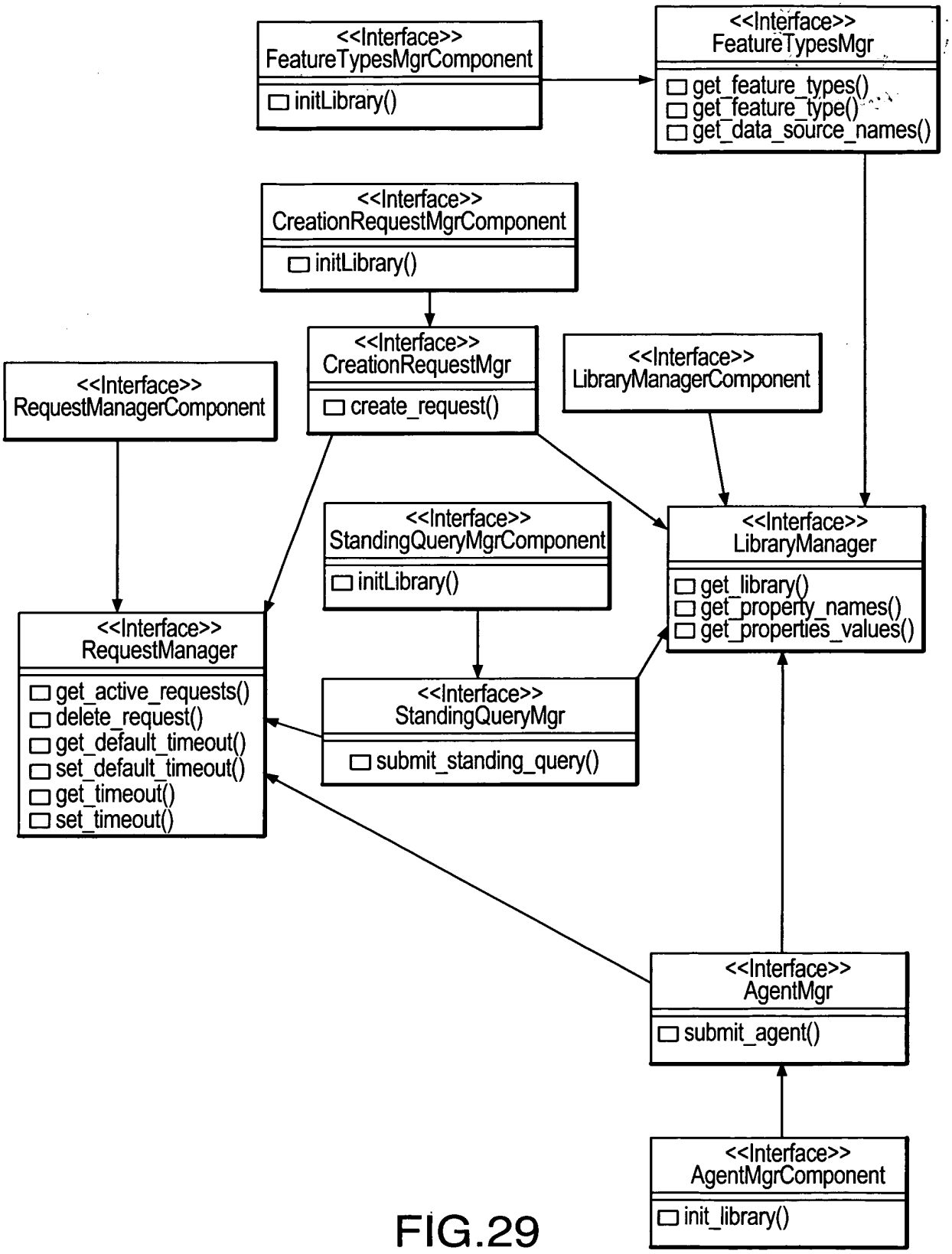

<<Interface>>
FeatureTypesMgrComponent
initLibrary()
<<Interface>>
FeatureTypesMgr
get_feature_types()
get_feature_type()
get_data_source_names()
<<Interface>>
CreationRequestMgrComponent
initLibrary()
<<Interface>>
CreationRequestMgr
create_request()
<<Interface>>
LibraryManagerComponent
<<Interface>>
RequestManagerComponent
<<Interface>>
StandingQueryMgrComponent
initLibrary()
<<Interface>>
LibraryManager
get_library()
get_property_names()
get_properties_values()
<<Interface>>
RequestManager
get_active_requests()
delete_request()
get_default_timeout()
set_default_timeout()
get_timeout()
set_timeout()
<<Interface>>
StandingQueryMgr
submit_standing_query()
<<Interface>>
AgentMgr
submit_agent()
<<Interface>>
AgentMgrComponent
init_library()

FIG.29

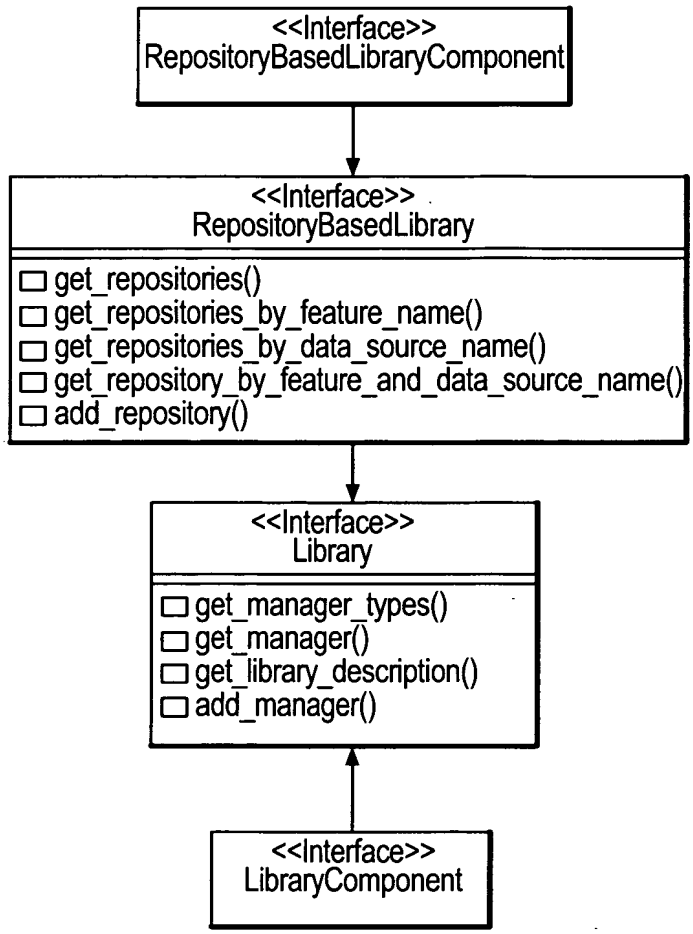


FIG.30

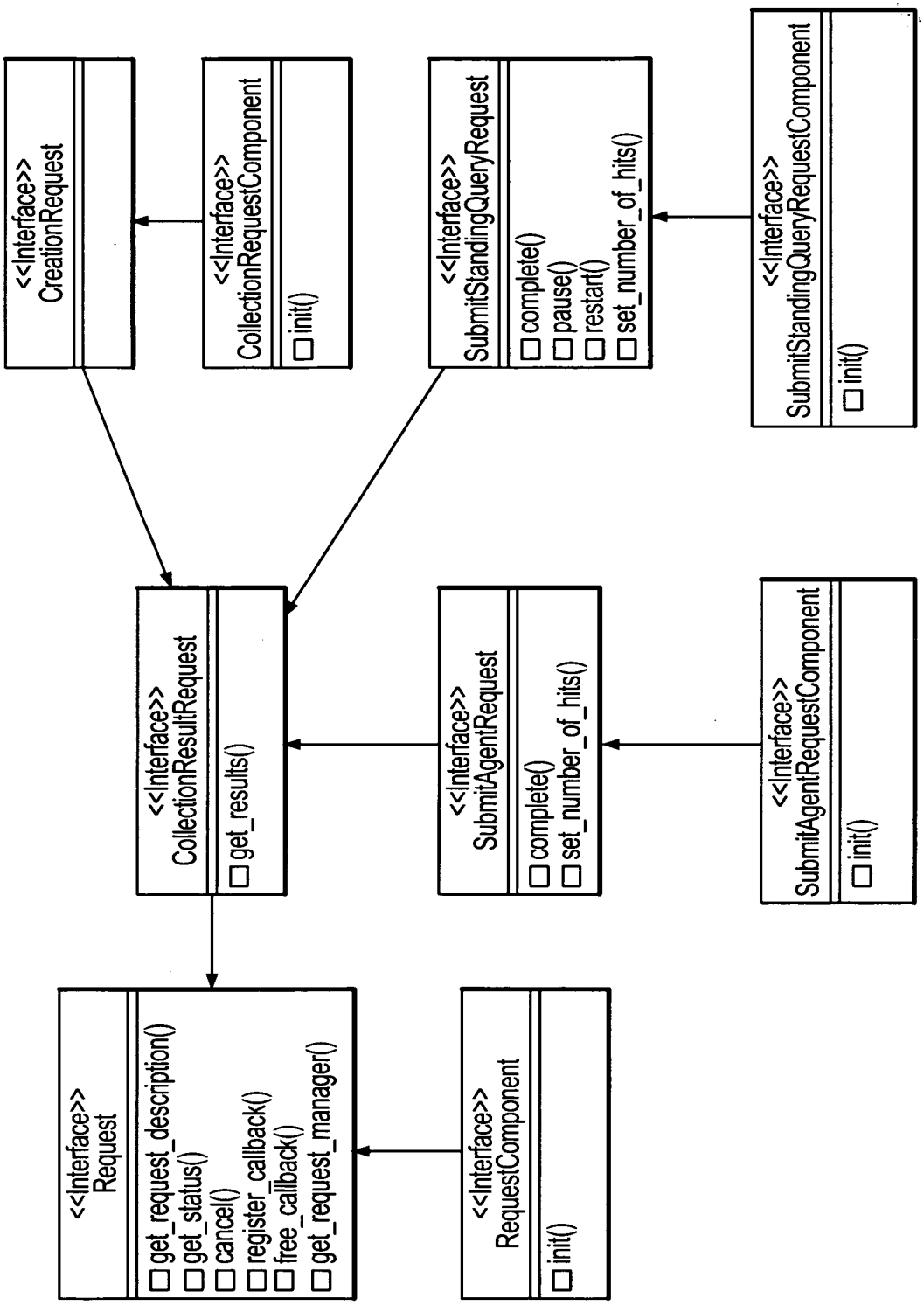

<<Interface>>
CreationRequest
<<Interface>>
CollectionRequestComponent
init()
<<Interface>>
SubmitStandingQueryRequest
complete()
pause()
restart()
set_number_of_hits()
<<Interface>>
SubmitStandingQueryRequestComponent
init()
<<Interface>>
CollectionResultRequest
get_results()
<<Interface>>
SubmitAgentRequest
complete()
set_number_of_hits()
<<Interface>>
SubmitAgentRequestComponent
init()
<<Interface>>
Request
get_request_description()
get_status()
cancel()
register_callback()
free_callback()
get_request_manager()
<<Interface>>
RequestComponent
init()

FIG.31

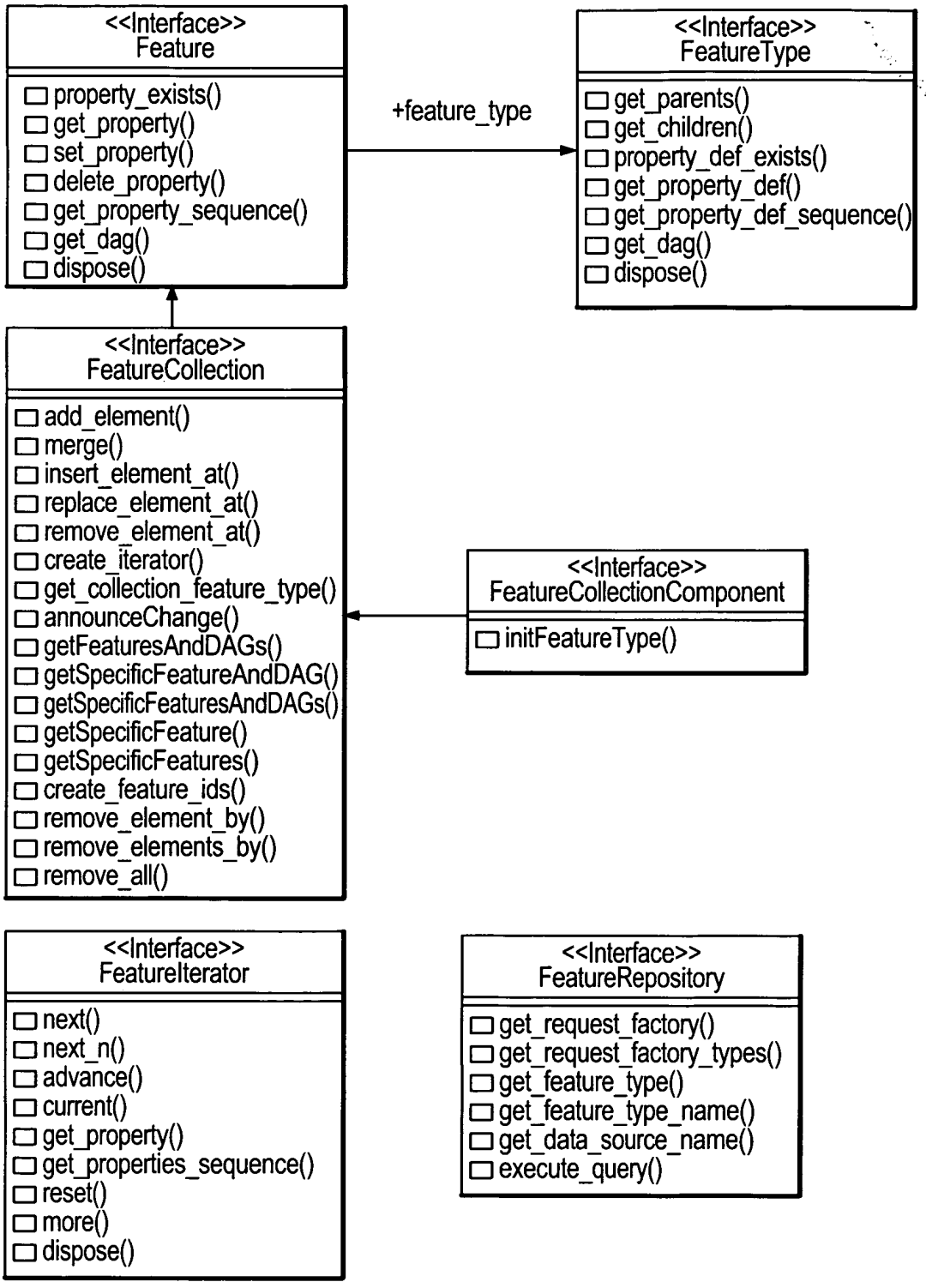

<<Interface>>
Feature
property_exists()
get_property()
set_property()
delete_property()
get_property_sequence()
get_dag()
dispose()
+feature_type
<<Interface>>
FeatureType
get_parents()
get_children()
property_def_exists()
get_property_def()
get_property_def_sequence()
get_dag()
dispose()
<<Interface>>
FeatureCollection
add_element()
merge()
insert_element_at()
replace_element_at()
remove_element_at()
create_iterator()
get_collection_feature_type()
announceChange()
getFeaturesAndDAGs()
getSpecificFeatureAndDAG()
getSpecificFeaturesAndDAGs()
getSpecificFeature()
getSpecificFeatures()
create_feature_ids()
remove_element_by()
remove_elements_by()
remove_all()
<<Interface>>
FeatureCollectionComponent
initFeatureType()
<<Interface>>
FeatureIterator
next()
next_n()
advance()
current()
get_property()
get_properties_sequence()
reset()
more()
dispose()
<<Interface>>
FeatureRepository
get_request_factory()
get_request_factory_types()
get_feature_type()
get_feature_type_name()
get_data_source_name()
execute_query()

FIG.32

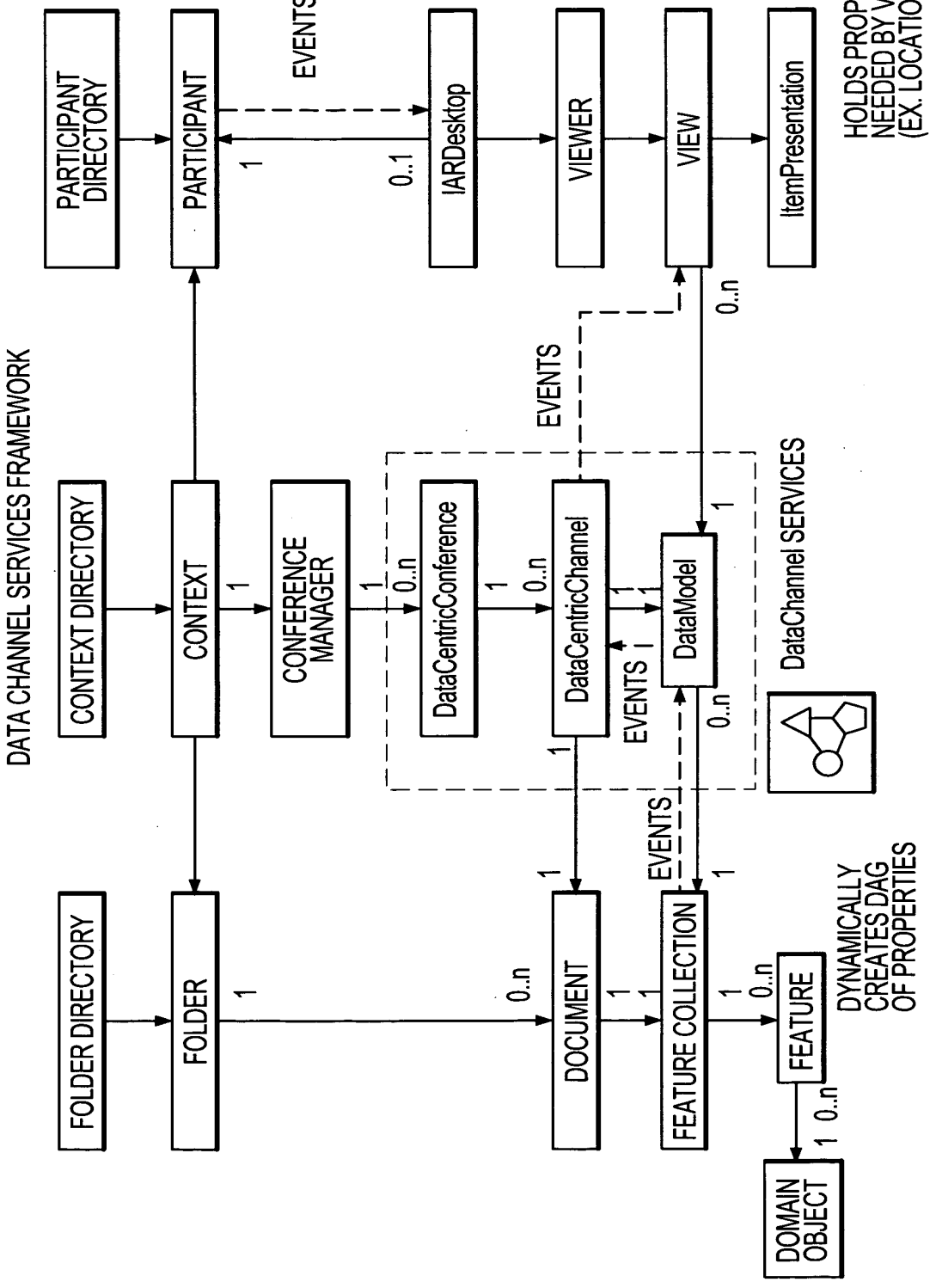

DATA CHANNEL SERVICES FRAMEWORK
PARTICIPANT DIRECTORY
PARTICIPANT
EVENTS
IARDesktop
VIEWER
VIEW
ItemPresentation
HOLDS PROPERTIES NEEDED BY VIEW (EX. LOCATION, SYMBOL)
CONTEXT DIRECTORY
CONTEXT
CONFERENCE MANAGER
DataCentricConference
DataCentricChannel
DataModel
DataChannel SERVICES
FOLDER DIRECTORY
FOLDER
DOCUMENT
FEATURE COLLECTION
FEATURE
DOMAIN OBJECT
DYNAMICALLY CREATES DAG OF PROPERTIES
0..1
0..n
1

FIG.33

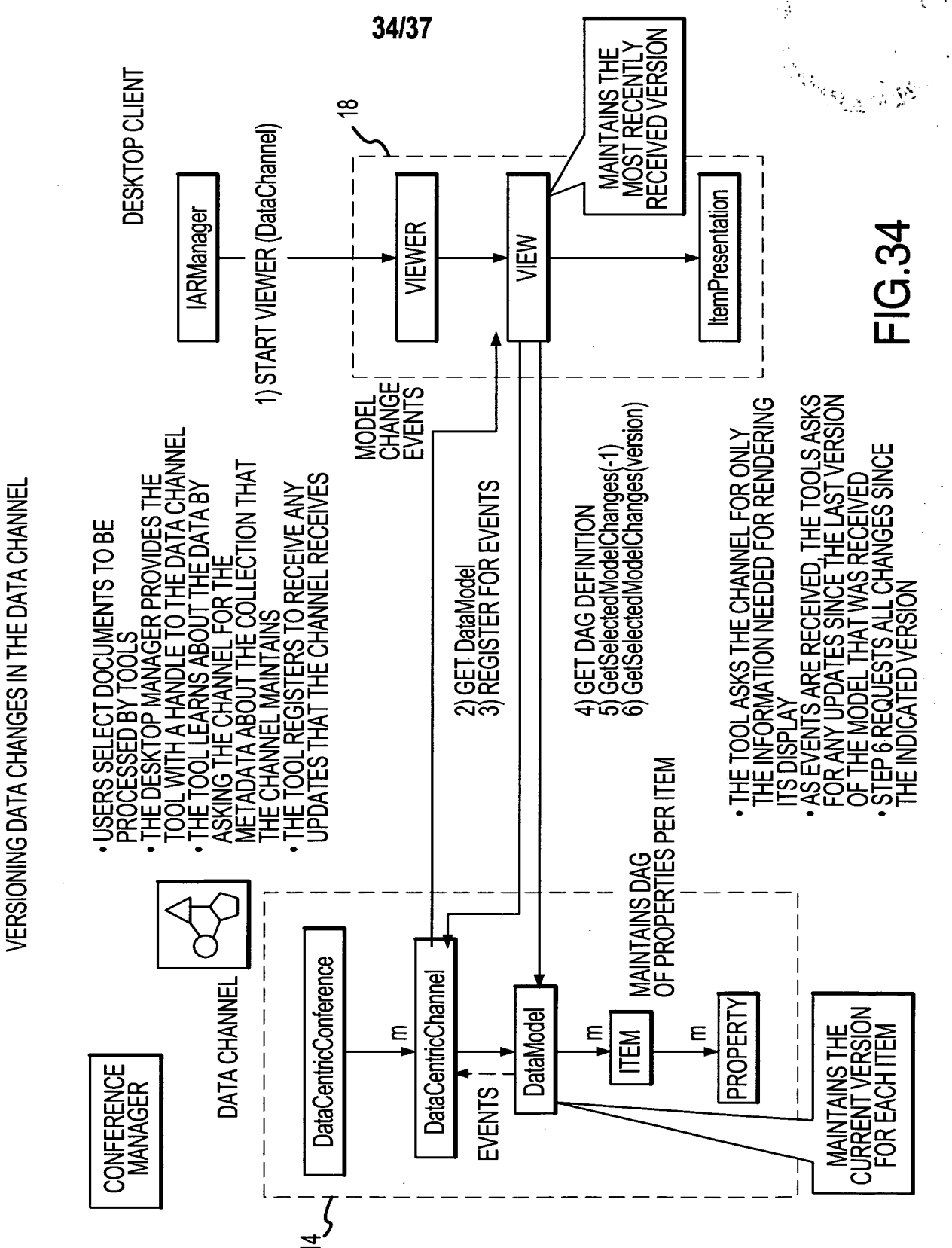

VERSIONING DATA CHANGES IN THE DATA CHANNEL
DESKTOP CLIENT
IARManager
1) START VIEWER (DataChannel)
18
VIEWER
VIEW
MAINTAINS THE MOST RECENTLY RECEIVED VERSION
ItemPresentation
MODEL CHANGE EVENTS
• USERS SELECT DOCUMENTS TO BE PROCESSED BY TOOLS
• THE DESKTOP MANAGER PROVIDES THE TOOL WITH A HANDLE TO THE DATA CHANNEL
• THE TOOL LEARNS ABOUT THE DATA BY ASKING THE CHANNEL FOR THE METADATA ABOUT THE COLLECTION THAT THE CHANNEL MAINTAINS
• THE TOOL REGISTERS TO RECEIVE ANY UPDATES THAT THE CHANNEL RECEIVES
2) GET DataModel
3) REGISTER FOR EVENTS
4) GET DAG DEFINITION
5) GetSelectedModelChanges(-1)
6) GetSelectedModelChanges(version)
• THE TOOL ASKS THE CHANNEL FOR ONLY THE INFORMATION NEEDED FOR RENDERING ITS DISPLAY
• AS EVENTS ARE RECEIVED, THE TOOLS ASKS FOR ANY UPDATES SINCE THE LAST VERSION OF THE MODEL THAT WAS RECEIVED
• STEP 6 REQUESTS ALL CHANGES SINCE THE INDICATED VERSION
CONFERENCE MANAGER
DATA CHANNEL
DataCentricConference
m
DataCentricChannel
EVENTS
DataModel
m
ITEM
m
PROPERTY
MAINTAINS DAG OF PROPERTIES PER ITEM
MAINTAINS THE CURRENT VERSION FOR EACH ITEM
14

FIG.34

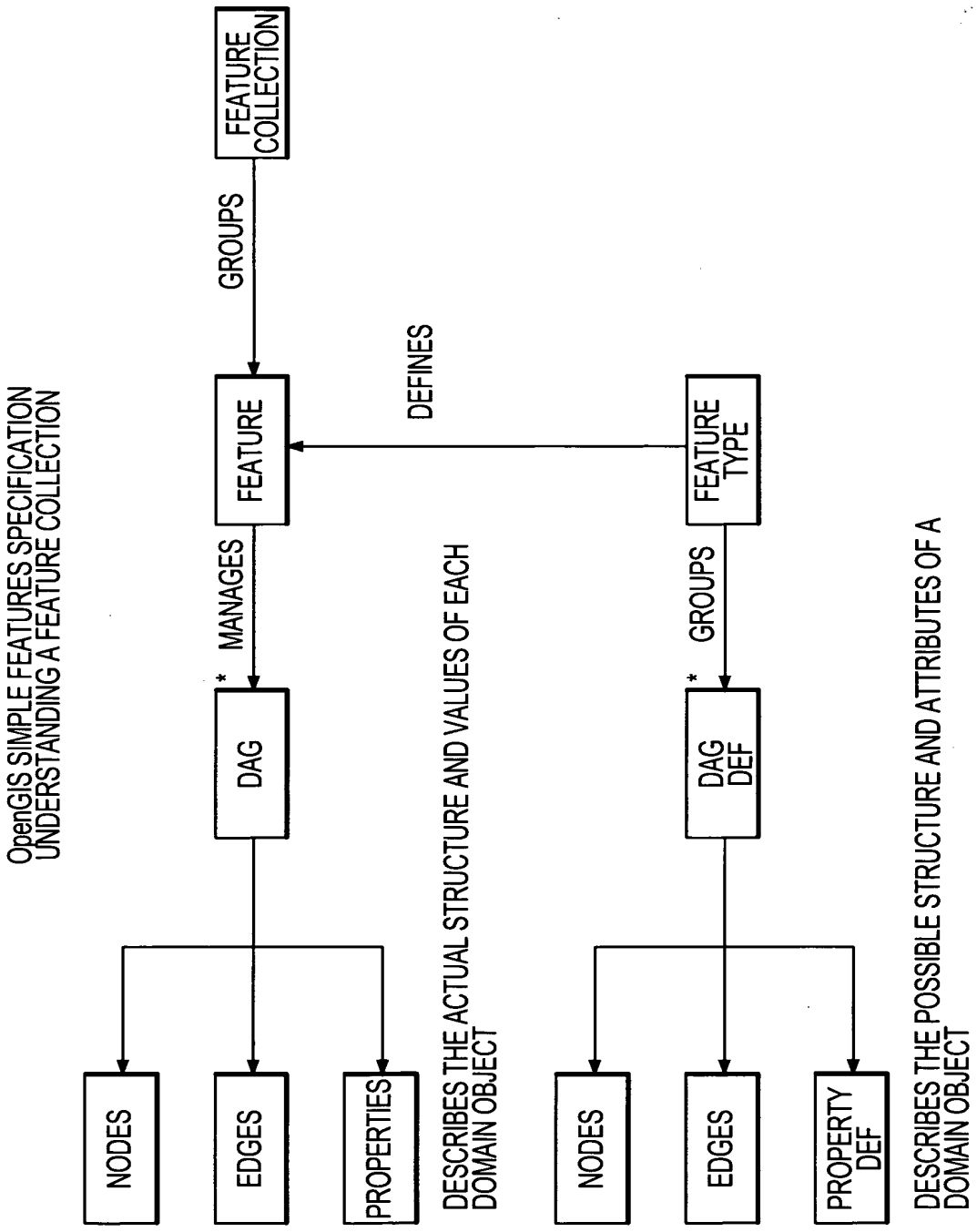

OpenGIS SIMPLE FEATURES SPECIFICATION
UNDERSTANDING A FEATURE COLLECTION
FEATURE COLLECTION
GROUPS
FEATURE
DEFINES
FEATURE TYPE
* MANAGES
DAG
* GROUPS
DAG DEF
NODES
EDGES
PROPERTIES
DESCRIBES THE ACTUAL STRUCTURE AND VALUES OF EACH DOMAIN OBJECT
NODES
EDGES
PROPERTY DEF
DESCRIBES THE POSSIBLE STRUCTURE AND ATTRIBUTES OF A DOMAIN OBJECT

FIG.35

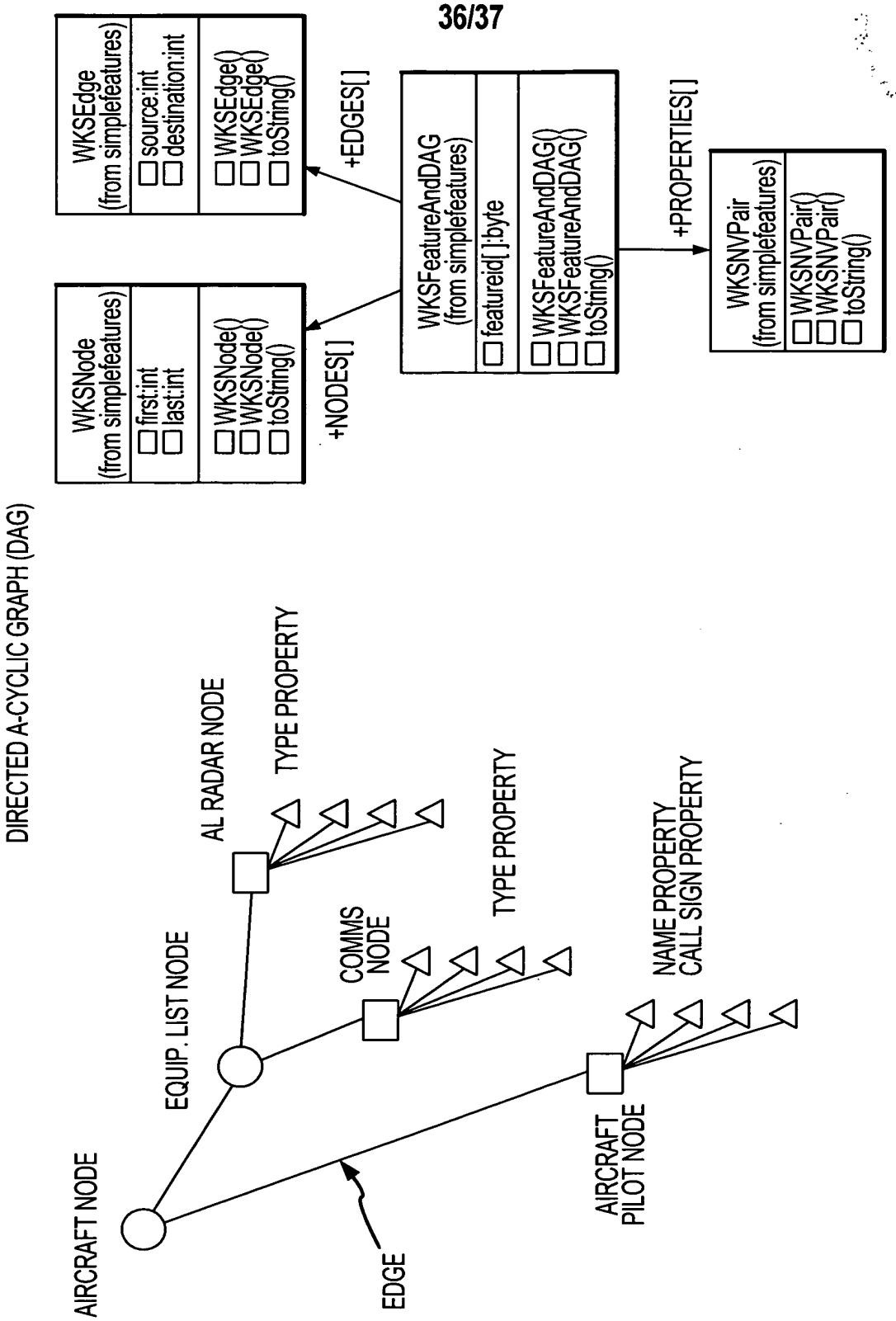

WKSEdge
(from simplefeatures)
source:int
destination:int
WKSEdge()
WKSEdge()
toString()
+EDGES[ ]
WKSFeatureAndDAG
(from simplefeatures)
featureid[ ]:byte
WKSFeatureAndDAG()
WKSFeatureAndDAG()
toString()
+PROPERTIES[ ]
WKSSNVPair
(from simplefeatures)
WKSNVPair()
WKSNVPair()
toString()
WKSNode
(from simplefeatures)
first:int
last:int
WKSNode()
WKSNode()
toString()
+NODES[ ]
DIRECTED A-CYCLIC GRAPH (DAG)
AIRCRAFT NODE
EQUIP. LIST NODE
AL RADAR NODE
TYPE PROPERTY
COMMS NODE
TYPE PROPERTY
AIRCRAFT PILOT NODE
NAME PROPERTY
CALL SIGN PROPERTY
EDGE

FIG.36

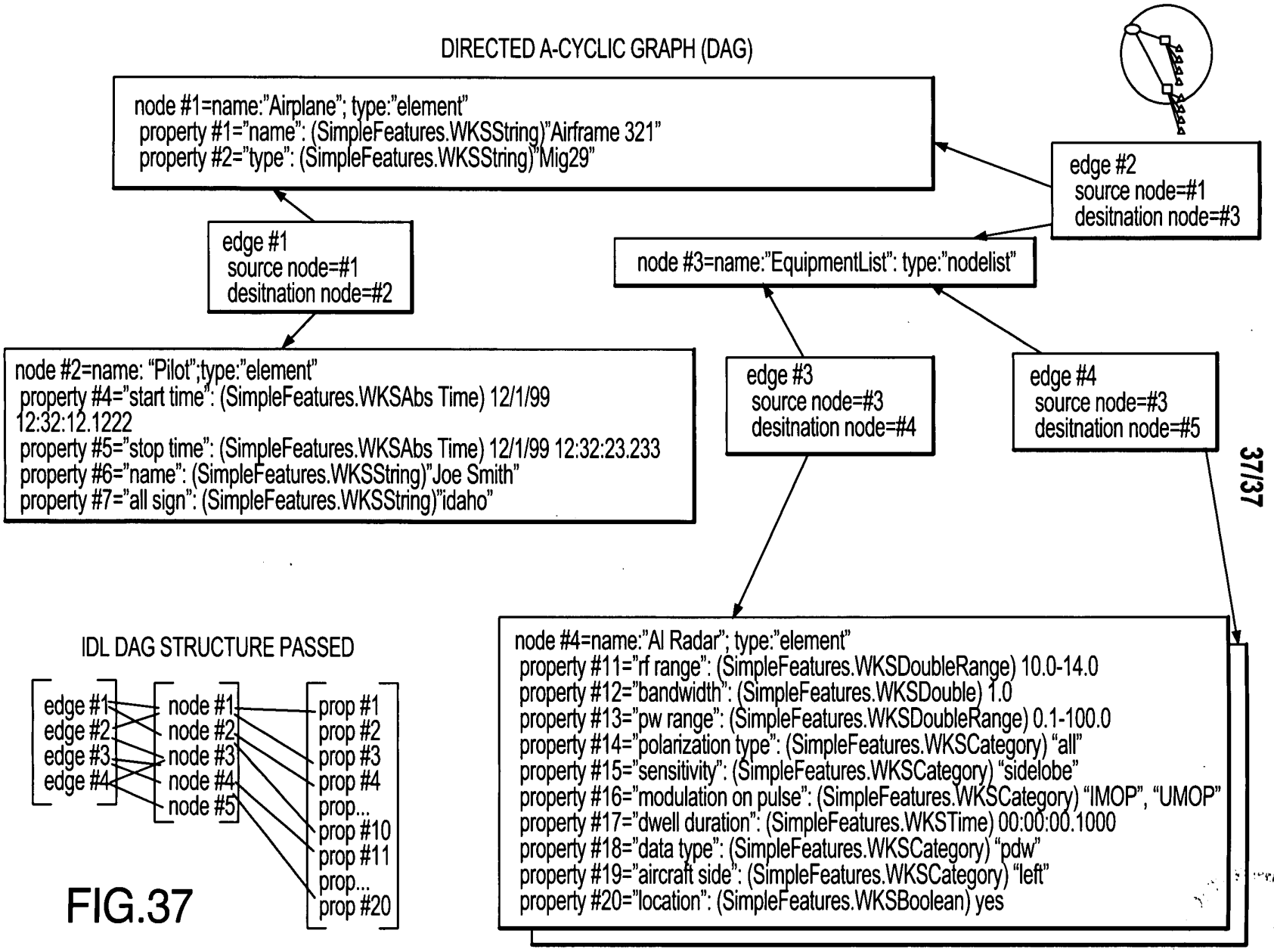


FIG.37

37/37

Serial No.: 09/782,926
Title: "Information Access, Collaboration And Integration System And
Docket No.: 41992-00405
Attorney: Robert B. Berube, Tel: (303) 338-0997